Marine Review

SHIP OPERATION SHIPBUILDING CARGO HANDLING

The National Publication Covering the Business of Transportation by Water

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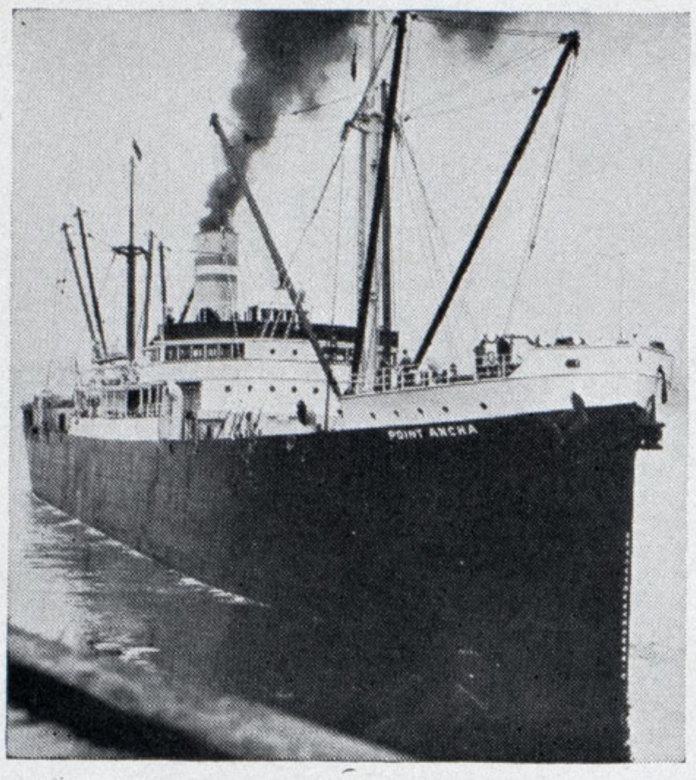

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Marine Review

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SHIP OPERATION - SHIPBUILDING - CARGO HANDLING

Volume 65 September, 1935 Number 9

Scuttling the Ship Subsidy Retards Recovery

WITH the adjournment of congress only a few days off, as this is written, all hope of passing any kind of ship legislation in this session is futile. The earnest and intensive efforts applied to the preparation of this legislation in and out of congress come to nothing for the time being.

As a result of this failure, the shipping industry is now in a very unsettled and chaotic condition. It would have been far better if no legislation had been initiated.

To give encouragement to heavy industries is universally considered an important step in recovery. Shipbuilding in normal times is one of the major heavy industries. As far as merchant work is concerned, this industry at the present time is almost non-existent. A considerable number of projects involving the building of ocean-going ships have been held up and deferred pending the outcome of shipping legislation. Three specific instances may be cited.

Early this year the American South African line, operating successfully under a mail contract between New York and South Africa, in order to meet definite needs of increasing business and in line with requirements of its contract with the government for new building, applied to the shipping board bureau for a construction loan. Plans for one and two vessels of large ocean-going size were ready, so that contract could have been placed with a shipyard in a very short time. This application has been under consideration by the bureau ever since and no action has been taken.

At about the same time the Mississippi Shipping Co., operating a mail contract service between New Orleans and the East Coast of South America, had completed plans and specifications for two new 9000-ton combination passenger and cargo vessels to cost approximately $3,900,000 for the two. Under the terms of its mail contract this line was required to build these two vessels; but under the law the post office department must certify to the shipping board specifically what class of vessels will meet the requirements. Nothing has happened. The reason again—expectation that shipping legislation, which would have the effect of clarifying the situation, would be passed.

On March 19 the secretary of commerce entered into a contract with the United States Lines Co. The outstanding provision of this contract was that the company definitely agreed to construct a third ocean liner similar to the MANHATTAN and WASHINGTON for transatlantic service. Prompt construction of the new vessel was guaranteed by requiring the payment of $1,000,000 as liquidated damages if the contract for the construction of the new vessel is not awarded within six months, unless that time is extended by the secretary of commerce.

This contract anticipates the enactment of new legislation in which the government will assume the excess cost of construction in this country over that in a foreign shipyard. It also provides that no construction loan will be made by the government unless congress adjourns without enacting new legislation.

In this instance, nothing has been done so far in placing the contract, though the time limit is not up until Sept. 15. The building of this vessel will call for the expenditure of about $12,000,000 and would be of substantial benefit to the heavy industries of the country. Regardless of the failure to enact the ship subsidy legislation in this session, some way must be found to carry on with the plan to build this ship which is badly needed to round out an established and successful service.

These are but some of the instances among numerous others where initiative has been deadened in carrying out plans for new ships.

According to official figures only one merchant vessel of any size is now under construction in all of the shipyards of the United States, and that vessel is a ferryboat for service on the North river between Manhattan and Jersey.

Ship Subsidy Legislation, Passage Not Expected

On Aug. 19 there remained hardly any prospect that the ship subsidy legislation would be passed in the present session of congress. It will have to go over as unfinished business until congress again meets in its regular session in January. About all that is expected at this time is that a joint resolution will be passed extending the time (now due to expire Oct. 31) in which the President would have the authority to deal with the ocean mail contracts, cancelling or modifying them as he may decide, by executive order.

Senator Copeland of New York has repeatedly called attention to the necessity of action on the ship subsidy legislation and recently in urging agreement to fix a definite time for considering this legislation in the senate said:

"It is very vital that something should be done about it. On Oct. 31 the mail contracts will be canceled or modified. What will then happen to the American merchant marine?"

To this Senator Robinson replied, "There are a number of bills including the bill the senator referred to which it is my intention to give the senate an opportunity to consider as soon as it can be reached. I cannot tell the senator just when it may be possible to take up the bill to which he refers. I am told it involves some controversial features."

The current status of the ship subsidy legislation at this time is, therefore, as follows: A bill prepared by the house committee, of which Congressman Bland of Virginia is chairman, has been passed by the house. A bill along somewhat similar lines, but with certain important differences, was reported out of committee in the senate but has not been acted upon.

It was made clear by the President that neither the house nor senate bills were satisfactory. An administration version of what the ship subsidy legislation should cover was then prepared. Henry H. Heimann, former director of the shipping board bureau, was one of the chief authors of this measure.

This new administration sponsored ship subsidy bill with some modification was favorably reported by the senate commerce committee. In reporting this bill, in order to expedite its passage in both houses, all of the provisions of the Bland bill as it passed the house, after the enacting clause, were struck out and the administration measure as amended by the committee substituted.

There are a number of provisions of this new bill to which steamship owners vigorously object and hearings were requested. These were denied as it was felt that any prolonged discussion at this time would prevent any possible passage of the bill in this session.

Among the objections to the measure are, the limit set on salaries of executives of steamship lines receiving aid under the subsidy at $25,000 a year, and the limitation of profits to 6 per cent. It was also felt that the proviso that no one who had been actively engaged in the shipping industry within the last three years should be eligible to appointment as a member of the maritime authority ought to be eliminated or modified.

Objection was also raised to the limitation of a differential in building cost to 33 1/3 per cent. Some types of ships can be built abroad for from 40 to 60 per cent less than in American shipyards.

Increase in Traffic Noted

For the fiscal year, ending June 30, 1935, an increase of $21,000,000 in exports and $19,000,000 in imports is shown over the preceding year at the port of Los Angeles. Exports for the same period during 1934 aggregated 4,552,885 tons with a value of $88,614,080; while imports amounted to 701,109 tons with a valuation of $59,064,925.

Total foreign trade for the year ending June 30, 1935 was more than $147,000,000 compared with $107,000,000 in the year ending June 30, 1934, and a little less than $75,000,000 for the year ending June 30, 1933.

A Separate Steam Plant

Seven hundred cooks, waiters, stewards, stewardesses, and their service assistants will comprise the staff to prepare and serve food to passengers on the new Cunard White Star liner, QUEEN MARY, when the vessel enters service next year. Most of the meals will be served in the main dining saloon which extends the entire width of the ship, and has seating accomodations for 850 passengers. As many as 40,000 meals will be served on the transatlantic voyage of the vessel.

The QUEEN MARY is now undergoing her finishing touches on the Clyde. She will be the first ship to have an exclusive steam generating plant for its hotel services, three of the ship's boilers being reserved for this purpose. These boilers will operate independently from the liner's propelling machinery, supplying all electricity necessary to run the ship's kitchen, bakeries, dumbwaiters, refrigerating plant and allied services.

The same electric system will operate the 30,000 light lamps, 1000 fans and 21 elevators, and will supply hot and cold water to the passenger accomodations and two swimming pools.

Waterborne Commerce Up In Philadelphia Area

Waterborne commerce in the Philadelphia area, which includes Trenton, Camden, and Wilmington, recovered during 1934 to a point where, at a total of 30,804,134 short tons of cargo, it is 8 per cent above the "normal" year of 1926, and gained 1½ per cent over that of 1933, according to the annual report recently submitted to the chief of engineers, by Lieut. Col. John C. H. Lee, district engineer in charge of river and harbor improvement in Philadelphia.

Even compared with the peak year 1930, when waterborne commerce reached a total of 31,315,145 tons, the amount during 1934 was only 1.6 per cent lower, and as compared with the low period of 1932, last year's cargo gain was 11½ per cent.

In 1934 the total value of cargo in the Philadelphia area was $875,839,188 compared with $733,627,994 in 1933, or a gain of 16.2 per cent, and as compared with the low of $638,568,687 in 1932, the gain was 27 per cent. The decrease in value, however, was 35½ per cent as compared with "normal" year of 1926.

During 1934, commerce moving directly to and from the large terminals on the Delaware river, Philadelphia, to the sea, totaled 20,280,083 tons, with a reported value of $768,571,583 which was an increase in volume of about 7 per cent and an increase in value of about 21 per cent over 1933.

Imports at Philadelphia during 1934 increased 2.6 per cent and exports 10 per cent, with the coastwise trade larger than in 1933 by 11 per cent. The principal commodities showing increased tonnage were molasses and sugar imports and among the exports, iron and steel scrap. The movement of coal, coke, petroleum products and vegetable food products increased in the coastwise trade.

Vessels carrying these commodities in the foreign and coastwise trade made 15,311 trips inbound and outbound, as compared with 14,676 trips in 1933, and 13,654 trips in 1932. The army engineers maintain a channel depth of 35 feet in the Delaware river to Allegheny avenue and the drafts of vessels using the channel in this trade in 1934 ranged from 8 feet to 32 feet.

At the regular meeting of the board of directors of the Radiomarine Corporation of America, Aug. 7, Charles J. Pannill was elected president. Mr. Pannill joined the company in 1928, and is the holder of American radio operator's license No. 1, the first operator's license issued by the American government.

Bids are Opened for Building Thirteen Naval Vessels

ON AUGUST 7, at the navy department, Washington, D. C., proposals for the construction of 13 of the 24 naval vessels of the 1935 building program were opened by Secretary Swanson, in the presence of the assistant secretary, the chief of naval operations, the chiefs of bureaus of the navy department and officials of shipbuilding companies.

Six shipbuilding companies submitted bids for the construction of the following vessels: One light cruiser, 10,000 tons standard displacement, authorized Feb. 13, 1929; one aircraft carrier, about 14,700 tons standard displacement, authorized March 27, 1934; three torpedo boat destroyers, not over 1850 tons each standard displacement, authorized March 27, 1934; five torpedo boat destroyers, not over 1500 tons each standard displacement, authorized March 27, 1934; and three submarines, of approximately 1400 tons each, standard displacement, authorized March 27, 1934.

Fifteen major bids, accompanied by alternate proposals on modification of the navy department designs for hull or machinery were received, and also proposals with provisions for the adjustment of costs for labor and material. Both the original and the adjusted proposals were generally considerably higher than those submitted a year ago on similar types of vessels.

One Aircraft Carrier

Newport News Shipbuilding & Dry Dock Co. was low bidder on both the aircraft carrier and light cruiser. Its bid on the aircraft carrier for delivery in 38 months was $24,434,000 and with adjustment provisions $21,247,000. The Bethlehem Shipbuilding Corp. Ltd., Quincy, Mass., the only other shipyard submitting proposals on the aircraft carrier, bid $26,000,000, delivery in 36 months, and with adjustment provisions, $20,812,000.

One Light Cruiser

For building the light cruiser, Newport News Shipbuilding & Dry Dock Co., submitted a bid of $15,525,000, delivery in 34 months and with adjusted provisions, $13,500,000, The next lowest bidder was the Federal Shipbuilding & Dry Dock Co., Kearny, N. J., $17,000,000, delivery 36, months and with adjustment provisions, $15,200,000. Bethlehem Shipbuilding Corp. Ltd. submitted a bid at $17,600,000, delivery 36 months and with adjustment provisions, $14,100,000. United Shipbuilding & Dry Dock Co., and United Dry Docks, Inc., 11 Broadway New York, submitted a bid of $17,920,000, delivery 36 months, and with adjustment provisions, $15,590,000.

Bids on Three Submarines

The Electric Boat Co., Groton, Conn., was the only yard which submitted bids for the building of the three submarines. Its bids were as follows:

Class 1, department's design—delivery in 27, 27 and 30, 27, 30 and 33 months. One vessel, $3,587,000, and with adjustment provisions, $3,327,000. Two vessels, $2,977,000 each and with adjustment provisions, $2,757,000 each. Three vessels, $2,727,000 each, and with adjustment provisions, $2,527,000 each.

Class 2-A, bidder's design and government's arrangement of machinery—One vessel, $3,537,000, and with adjustment provisions, $3,277,000 Two vessels, $2,937,000 each, and with adjustment provisions, 2,717,000 each. Three vessels, $2,697,000 each, and with adjustment provisions, $2,497,000 each.

Class 2-B, (alternate bid)—The amounts were identical to Class 2-A.

Three Destroyers, 1850 Tons Each

Three shipyards submitted bids for the heavy destroyers Nos. 394, 395, and 396, as follows:

Federal Shipbuilding & Dry Dock Co., Kearny, N. J.—Delivery, one, 27 months; two, 27 and 30 months; three, 27, 30 and 33 months. One vessel, $5,932,000 and with adjustment provisions, $5,158,000. Two vessels, $5,276,000 each, and with adjustment provisions, $4,588,000 each. Three vessels, $5,017,000 each, and with adjustment provisions, $4,363,000 each.

United Shipbuilding & Dry Dock Inc., New York—Delivery, one, 30 months; two, 30 and 32 months; three, 30, 32 and 34 months. One vessel, $6,325,000, and with adjustment provisions, $5,500,000. Two vessels, $5,610,000 each, and with adjustment provisions, $4,880,000 each. Three vessels, $5,310,000 each, and with adjustment provisions, $4,620,000 each.

Bath Iron Works Corp., Bath, Me.—Delivery, one, 27 months; two, 27 and 30 months; three, 27, 30 and 33 months. One vessel, $5,400,000, and with adjustment provisions, $5,030,019. Two vessels, $4,620,000 each, and with adjustment provisions, $4,312,934 each. Three vessels, $4,360,000 each, and with adjustment provisions, $4,042,500 each.

From the above, it will be noted that the Bath Iron Works Corp. was the low bidder in all the proposals for building the 1850-ton destroyers.

Five Destroyers, 1500 Tons Each

Bids were submitted by five shipyards on one, two or three destroyers of this class, numbered 397, 398, 399, 400 and 401, as follows:

Bethlehem Shipbuilding Corp., Quincy, Mass., Fore River plant—Delivery, 27 months. One vessel, $4,560,000, and with adjustment provisions, $3,649,000. An additional proposal was made with provisions that if the vessel constructed be a duplicate of destroyers Nos. 380-382, now being built by this company, a deduction of $55,000 will be made in the price and the delivery time will be shortened by 3 months.

Federal Shipbuilding & Dry Dock Co., Kearny, N. J.—Delivery, one, 26 months; two, 26 and 29 months; three, 26, 29 and 32 months. One vessel, $5,768,000, and with adjustment provisions, $5,035,000. Two vessels, $4,930,000 each, and with adjustment provisions, $4,306,000 each. Three vessels, $4,693,000 each, and with adjustment provisions, $4,100,000 each.

The same company also submitted bids for class 2—department's design of hull, bidder's design of machinery, as follows: Delivery, 27, 30 and 33 months. One vessel, $5,836,000, and with adjustment provisions, $5,075,000. Two vessels, $4,887,000 each, and with adjustment provisions, $4,250,000 each. Three vessels, $4,629,000 each, and with adjustment provisions, $4,025,000 each. Six modifications of this proposal were offered.

United Shipbuilding & Dry Dock Co., New York—Delivery, one, 27 months; two, 27 and 30 months; three, 27, 30 and 33 months. One vessel, $5,624,000, and with adjustment provisions, $4,890,000. Two vessels, $4,963,000 each, and with adjustment provisions, $4,315,000 each. Three vessels, $4,696,000 each, and with adjustment provisions, $4,084,000 each.

Proposals for construction on the department's design of hull and the company's design of machinery were: one vessel, $5,800,000; two vessels, $5,110,000 each; and three vessels, $4,845,000 each. Several modifications of the proposals were also offered.

Bath Iron Works Corp., Bath, Me.—Delivery, one, 27 months; two, 27 and 30 months; three, 27, 30 and 33 months. One vessel, $5,000,000, and with adjustment provisions, $4,655,868. Two vessels, $4,260,000 each, and with adjustment provisions, $3,944,468. Three vessels, $3,975,000 each, and with adjustment provi-

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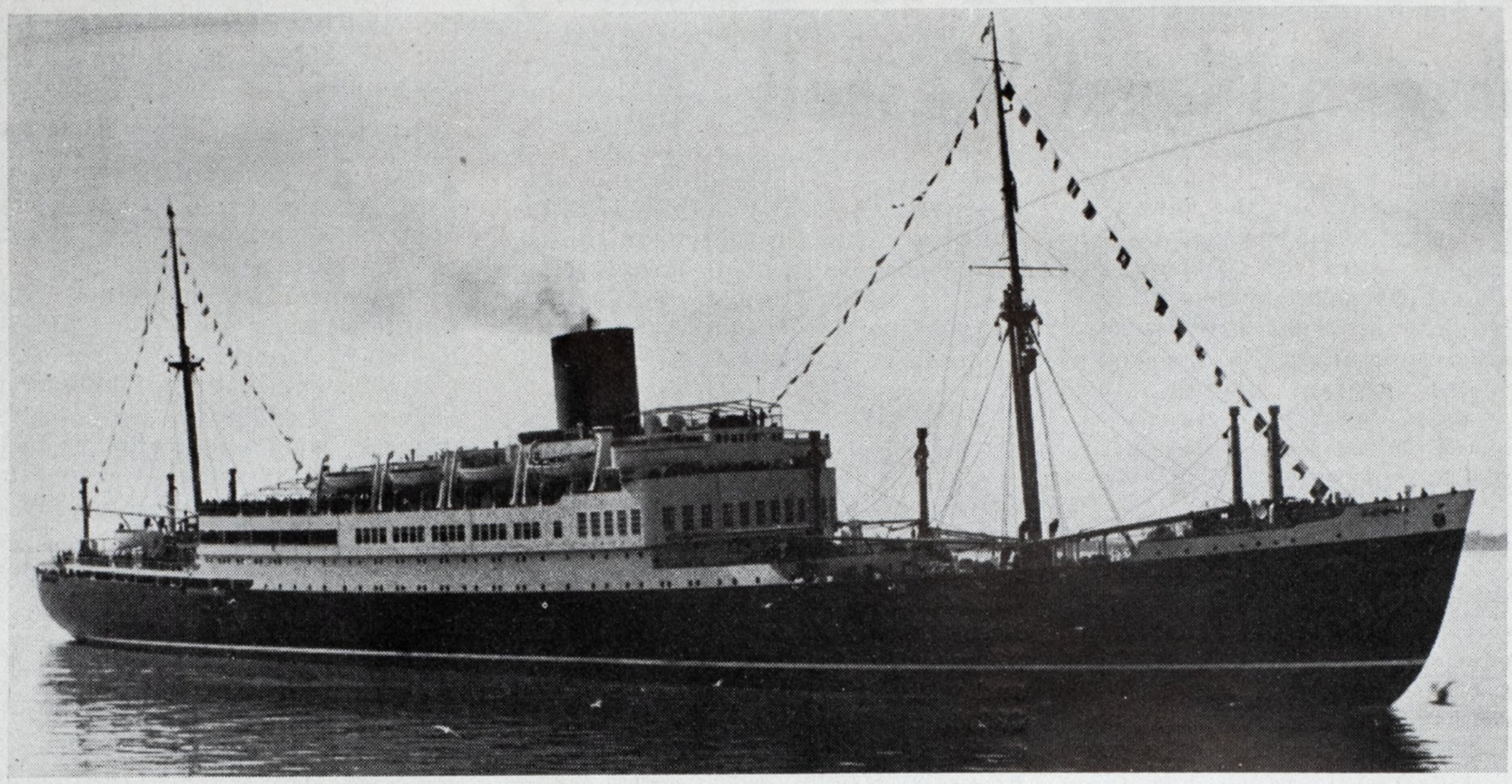


Twin screw turbine electric express liner Scharnhorst. Maierform bow. High pressure steam. Speed 21 knots

SCHARNHORST,

First German Turbine Electric Liner

BY A. H. JANSSON

GERMAN naval architecture and marine engineering in its most modern and up-to-date aspects is strikingly exemplified in the twin screw, turbine electric drive, passenger ship SCHARNHORST (shown in the accompanying illustration) and sisterships POTSDAM and GNEISENAU for the Far East express service of the North German Lloyd. The SCHARNHORST was launched at the shipyard of Deutsche Schiff-und Maschinenbau A. G., Bremen, on Dec. 14, 1934. Her trial trip was held on May 3, 1935. She commenced her maiden voyage from Hamburg for the Far East on May 8. The POTSDAM went into commission on July 3 and the GNEISENAU, launched on May 17, is to go into commission Dec. 4, 1935.

For Tropical Service

In the form of hull and in their machinery, these vessels are particularly interesting and unusual. With the Maierform bow and forebody, cruiser stern, fairly low single stack, and with the forward end of the deck erection rounded, these vessels are distinctly modern in appearance. The registered gross tonnage of the SCHARNHORST is about 18,300 tons and the two sisterships are of about the same tonnage.

These vessels are tropical ships and have comfortable accommodations for 142 passengers in the first class and 144 in the tourist class. The SCHARNHORST and POTSDAM are fitted with turbine electric machinery, developing 26,000 shaft horsepower in two propellers, giving a service speed of 21 knots. A speed of 24 knots was attained on trials by the SCHARNHORST. The GNEISENAU is fitted with Wagner-Bauer geared turbine machinery developing about the same horsepower with two propellers.

The principal characteristics of the SCHARNHORST are as follows: Length overall 651 feet, 7½ inches; length between perpendiculars, 610 feet, 3 inches; beam, 73 feet, 10 inches; depth to freeboard deck (B), 44 feet, 11¼ inches; draft, 29 feet; displacement at load draft, 23,900; deadweight, 10,800 tons.

This vessel is the first large German ship to be propelled by turbine electric drive, also, the comparatively high steam pressure (710 pounds per square inch) and high superheat (878 degrees Fahr.) are well above the steam conditions on a vessel of any considerable size up to this time.

Turbine Electric Drive

The propelling machinery, which was supplied by A. E. G. Berlin, consists of two main turbine alternators, each of which has a capacity of 10,000 kilowatts, with a maximum output of 12,400 kilowatts. The voltage is 3120 and the speed is 3120 revolutions per minute. The two propulsion motors each develop 13,000 shaft horsepower at 130 revolutions per minute. Each motor is direct connected to a 3-bladed bronze propeller, 18 feet, 1 inch in diameter.

Four Watertube Boilers

Steam is supplied by four watertube boilers, each having a heating surface of 7000 square feet and a superheating surface of 2240 square feet. The surface for preheating air for each boiler is about 11,200 square feet. Steam pressure at the boiler is 710 pounds per square inch and at the maneuvering valve it is 640 pounds per square inch. The temperature of the superheated steam at the boiler is 878 degrees Fahr., and the temperature of the steam at the maneuvering valve is 851 degrees Fahr.

The four watertube boilers are each fitted with two oil burners. The oil is broken up by centrifugal force. Each boiler has an upper and lower drum, and the tubes are arranged in three groups, two of which surround the combustion chamber and the third around the superheater.

For auxiliary power there are four direct current geared turbine genera-

tor sets, each of 675 kilowatts capacity at 230 volts. The turbine speed, which is 7000, is reduced to 1500 revolutions per minute.

The hull of the vessel is divided into 12 compartments by 11 watertight bulkheads. There are eight decks, six of which are used for passenger accommodations. These are the sun deck, promenade, main, A, B, and C decks. Decks D and E are reserved for cargo.

Loading and discharging is carried out without any disturbance to the passenger's comfort. There are 24 derricks, each capable of being swung through the arc of a complete circle. Ten of these derricks are for loads up to three tons; eight for loads up to five tons; four for loads not exceeding ten tons; one 25-ton derrick and one with a capacity of 50 tons.

The total capacity in the six holds of the SCHARNHORST is about 490,000 cubic feet. Each hold is divided off so that different parcels may be segregated according to ports. For particularly valuable goods, there are extra safe compartments and there is also a special acid compartment for chemicals.

There are four groups of suites for passengers, each comprising a bedroom, living room, reception room and two baths. The wide decks are especially suited for games and sports. Open air swimming pools have been installed for both first class and tourist.

For ventilation there is a Punkah-Louvre system by means of which fresh air is constantly supplied to all rooms. In the event of any dangerous fire the supply of air can be shut off at once from the bridge by stopping the ventilation motors. At the same time, all air shafts are automatically shut off by electro-magnetically operated trap doors. Special attention has been given to the ventilation of the engine room.

The navigation appliances are of the most modern type. Besides a gyro compass, there are: a radio depth finder, a submarine echo signal receiver and a Dr. Kempf log.

To accomodate well beyond the total number of passengers and crew there are ten unsinkable lifeboats. Two of these are equipped with propelling motors and are fitted with wireless. The boats are lowered to the water by means of a special mechanism which swings the boats out clear of the side of the ship. Each member of the crew is trained in practical lifeboat usage.

Crew Accomodations

The total number of the crew is 265. Accomodations are provided amidships and forward. They are well ventilated and are fitted with running water. The men of the crew have a common dining room with its own galley. A piano has been installed in the dining room; also a loud speaker for the transmission of music and arrangements for wireless reception. There is a special laundry for the crew; also baths, showers, and large washing rooms.

The route of the SCHARNHORST and sistership in the Far East run are: Outward bound — Hamburg-Bremen, Antwerp, Southampton, Palma de Majorca, Barcelona, Genoa, Naples, Port Said, Suez, Colombo, Penang, Singapore, Manila, Hongkong, Shanghai, Yokohama, and Kobe.

The scheduled duration of the voyage between some of the principal ports is as follows: Bremen - Genoa, 9 days; Genoa - Colombo, 11 days; Genoa - Singapore, 15 days; Genoa - Shanghai, 23 days; Hamburg-Bremen - Shanghai, 34 days; Antwerp - Southampton - Shanghai, 31 days.

All Outside Rooms

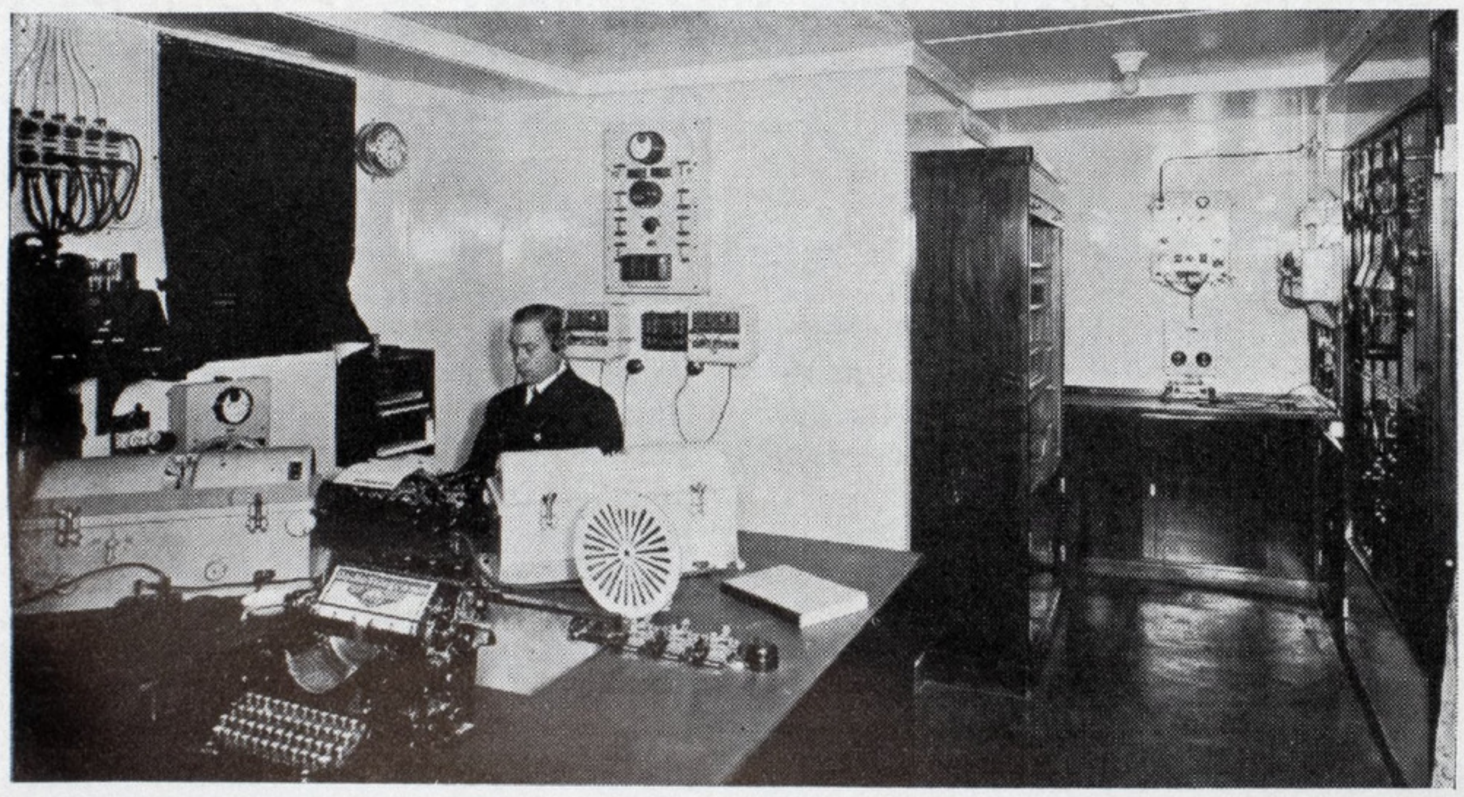
All the cabins in first class are outside rooms and are exceptionally large. All are fitted with wooden bedsteads, bed-commodes, built-in lockers, and wash-stands with running hot and cold fresh water. The tourist class cabins are also spacious. The beds are arranged in groups of two, one over the other. These cabins also are fitted with lockers and commodes and have running hot and cold fresh water.

To conform with her character as a tropical ship, the SCHARNHORST is unusually well fitted out for the convenience and comfort of passengers. In the first class alone, there are private baths and showers for 100 passengers. For passengers traveling in tourist class, baths and showers have been installed in a similar manner.

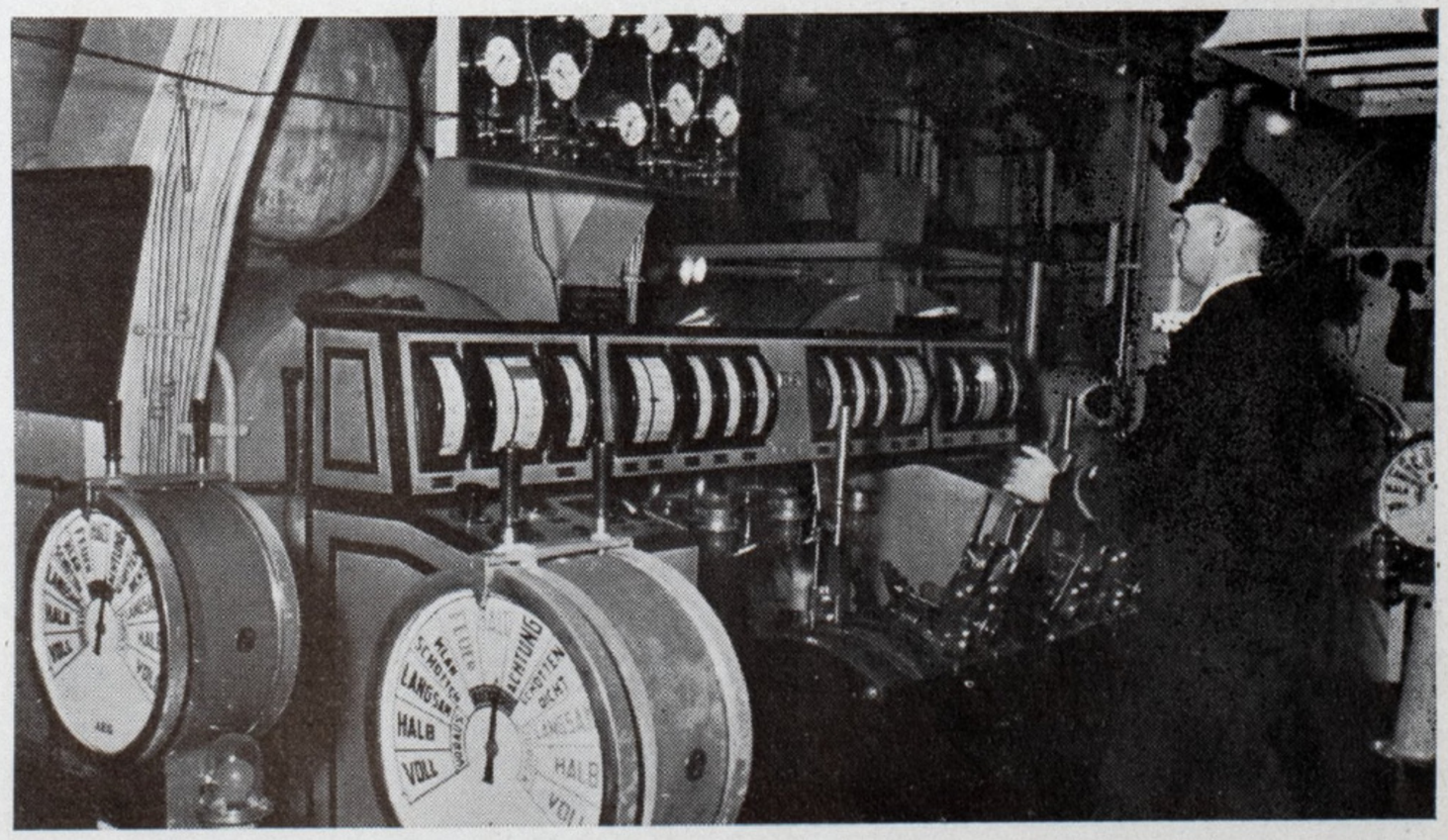
Protection against fire has been given special attention. By decentralizing the electric plants and by use of fireproof material in construction, the safety of the ship against fire is said to be greater than that of any other vessel of comparable size and service.

For the first time a foam extinguishing plant has been installed for combating the outbreak of fire in living quarters. Numerous foam hydrants are distributed throughout the habitable spaces. By opening a valve, foam is immediately released which suffocates any outbreak of fire. All the holds can also be covered with foam.

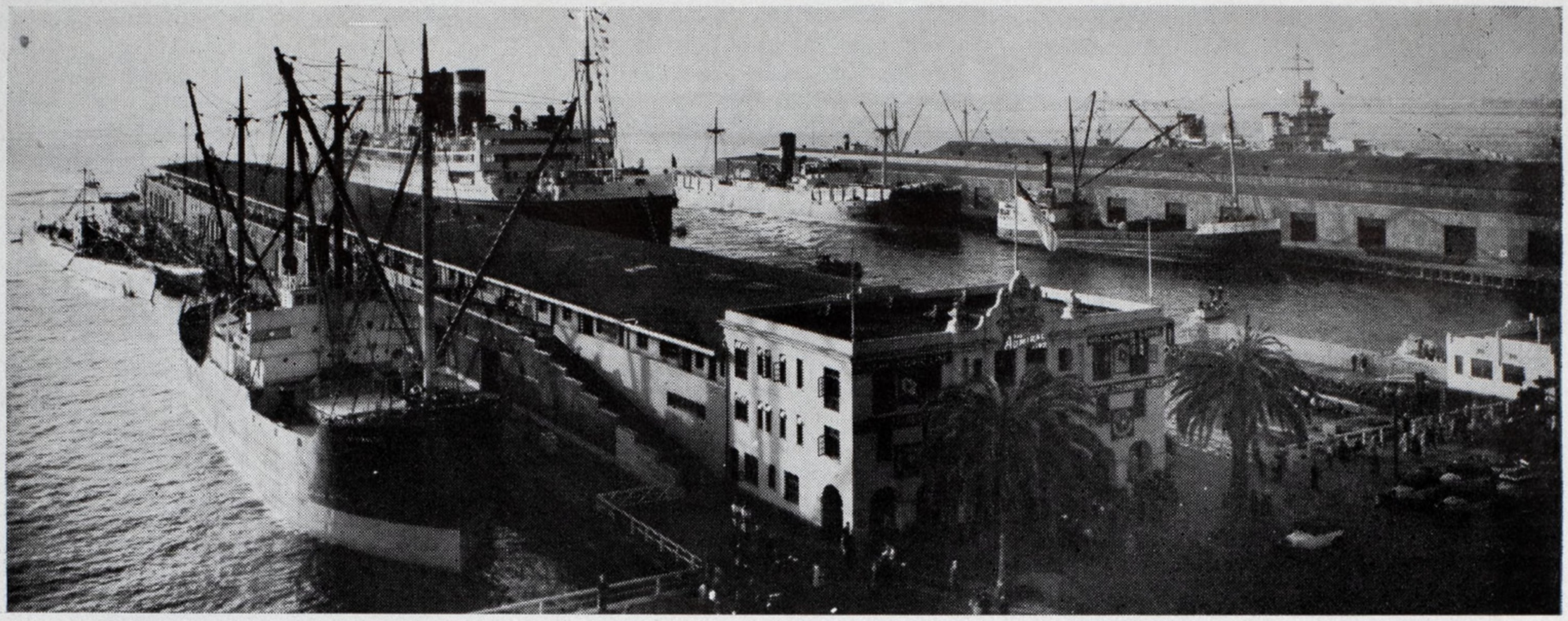
A water fire extinguishing plant has also been installed on an extensive scale with numerous hose connections. In addition, hand fire extinguishers are distributed all over the ship. Every member of the crew has been systematically trained to combat fire and specially trained firemen are on duty continuously day and night.



Radio room on the North German Lloyd's Far East express liner Scharnhorst



Operating controls in the engine room of the S. S. Scharnhorst—twin screw turbine electric drive



Municipal Piers at Port of San Diego, Calif. Broadway Pier in the foreground with the Panama Pacific liner California and other vessels alongside. Pier No. 1 at left in background

SAN DIEGO,

Port Traffic Is Steadily Increasing

BY C. F. REYNOLDS*

LOCATED about ten miles north of the boundary between United States and Mexico, San Diego, Calif., is the first port of call for incoming and the last port of call for outgoing vessels between the Pacific coast of the United States and Mexico, Panama, Central and South America, the Atlantic coast of the United States and Europe. By water it is located 97 nautical miles southeast of San Francisco, the entrance to the bay lying in latitude 32 degrees, 41 minutes north and in longitude, 117 degrees, 14 minutes west. It has for sometime been noted as an important base for the United States fleet. No less than 117 naval vessels are now using it for that purpose, and it is estimated that by 1937, 208 war vessels will be based at San Diego.

Presidential Naval Review

The California Pacific International exposition, now being held at San Diego, is attracting thousands of visitors from all over the world. The President will visit the exposition. One of the features of his visit will be a naval review in which approximately 130 vessels, with a personnel of 55,000 officers and men, will participate. For the first time, the navy's four great airplane carriers, the RANGER, LEXINGTON, SARATOGA, and LANGLEY, will be together as a unit of the fleet.

In its commercial aspects, the port of San Diego is making steady progress in which a well organized harbor department is taking an active part under the direction of J. W. Brennan, port director, and C. F. Reynolds, traffic manager.

San Diego is the oldest seaport in California and claims the honor of being the birthplace of that great state. Juan Rodriguez Cabrillo, a Portugese adventurer, sailing under the Spanish flag, discovered the bay in 1542, only 50 years after Columbus made his immortal western passage. Cabrillo named the bay San Diego in honor of the patron saint of Spanish mariners. The first American flag flown in San Diego was raised at La Playa near Point Loma in 1829. This was done by a party of sailors who had entered the harbor to load a cargo of hides.

During San Diego's years under Spain, Mexico and finally American dominion, its story has been one of consistent advance. It is interesting to note that the S. S. FINLAND of the Panama Pacific line, called at San Diego in May, 1915 on her first trip through the Panama canal. This was the inaugural voyage of the line which has grown to be such an important factor in the intercoastal trade.

Water commerce on the Pacific coast reached the lowest point in years last summer as a direct result of the longshoremen's strike. Port traffic at San Diego reached its low mark during August, 1934. Since this time the harbor traffic department has been steadily at work, not only in re-establishing the traffic diverted to land carriers, but also in attracting new commerce to the port. Any material increase in water commerce faced intensive competition with ports lying to the northward. This was particularly true of tonnage originating in or destined for points in Arizona and New Mexico as well as the Imperial valley, rich in agricultural products.

Flow of Commerce Aided

To facilitate commerce through the port, truck services on daily schedules were established from San Diego to points as far east as El Paso, Texas. Regular truck schedules between ship's side at the port of San Diego and store-door-delivery at interior destinations were made available at rates comparable with those from Los Angeles harbor. This was done to meet competition and to permit normal commercial development of the port of San Diego and its $10,000,000 harbor facilities. As a result of this well organized program for commercial development of the harbor the port has been showing steady increases in both inbound and outbound water commerce.

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*The author, C. F. Reynolds, is traffic manager, Harbor Department, City of San Diego.

The Consolidated Aircraft Corp. employing approximately 1800 men engaged directly or indirectly in the manufacture of aircraft, will during the present summer complete its removal from Buffalo to its new location at Lindbergh field San Diego. This important addition will further strengthen the city's position as an aviation center. This company holds government contracts for the construction of large amphibian ships for the United States navy.

San Diego is served by 25 steamship lines. Seven lines operate out of this port for the United Kingdom and Europe with general freight and passenger vessels; three are engaged in both foreign and intercoastal trade; six operate to Atlantic and Gulf ports; two to Gulf and Pacific ports; and seven lines operate to Pacific coast ports, as far north as Vancouver, B. C.

The port is served by two railroads, the San Diego and Arizona and the Atchison, Topeka and Santa Fe.

Nature of Commerce

To give some idea of the pre-depression commerce of the port, the following figures are quoted from a government report: During the calendar year 1929, commerce amounted to 958,100 short tons valued at $47,477,049 and the average tonnage for the ten years ending Jan. 1, 1930, was 753,846 tons of which the imports were 2.9 per cent, exports, 1.3 per cent, coastwise receipts, 93.4 per cent, and coastwise shipments, 2.4 per cent.

The principal items of import were fish, sand, stone, cement, steel and iron, paper, creosote, sugar, fertilizer, etc. The exports were, cotton, feed, clay products, cement and lime, petroleum products, sugar, etc. The principal coastwise receipts were petroleum products, 46 per cent, lumber and logs, 35 per cent; and the remainder, cement, sand, stone, and fish. Coastwise shipments comprised; fish 23 per cent; fruits and vegetables 21 per cent; soap and soap products 14 per cent; and cotton, cordage, automobiles, machinery, pipe and fittings in smaller amounts.

Of the total tonnage of the port, the statistics referred to show that at that time 96 per cent was represented by incoming cargo and 4 per cent for shipments. The shipments were practically all package goods, while the receipts were about 80 per cent bulk freight consisting largely of petroleum and products, lumber and logs, railroad ties, fresh fish, and creosote.

Two municipal piers, with their transit sheds, handle practically all of the general cargo of the port. These piers are located side by side on the central waterfront as shown in one of the accompanying illustrations and are served by the Atchison, Topeka & Santa Fe railroad. The Broadway pier is 1000 feet long and 130 feet wide, with a double deck transit and passenger shed. This is one of the municipal piers and is used exclusively by the passenger liners calling at the port.

Municipal Pier No. 1 is the terminal for practically all general cargo steamship lines entering the port. It is 1000 feet long, by 400 feet wide, and has a transit and storage shed, 970 feet long, by 140 feet wide. The north or upper half of this pier is open and provides about 150,000 square feet of space for bulk freight and stores. The municipal piers are equipped with adequate facilities for handling the freight now offered.

A large amount of the business of the port is in the handling of lumber, petroleum products and fresh fish for the canneries. For these trades 25 of the 49 piers and wharves at the port are used.

In addition to the municipal transit sheds, there are a number of privately owned warehouses including the Allison Bonded warehouse which is located adjacent to Municipal Pier No. 1. The port is served by the two important railway systems mentioned, which with their eastern connections form two of the transcontinental routes, an electric interurban railway, numerous truck lines and air lines. The port enjoys rates on transcontinental business similar to those at Los Angeles and the charges of rail carriers for terminal service of all kinds including switching, are similar to those at Los Angeles. Ocean rates on lines calling at San Diego are the same as those from other Pacific ports to the same destination.

Port Serves Large Area

With the additional facilities provided for handling general cargo, the port of San Diego can be of maximum service in developing the lower section of the state of California, which has great potentialities. The San Diego and Arizona Eastern railroad, a branch of the Southern Pacific lines, makes it possible for this port to serve territory of as far east as Texas and Oklahoma. The port is an advantageous outlet for long staple cotton which is being produced in increasing quantities in the Imperial valley and in Arizona.

San Diego bay is a crescent shaped basin, about 14 miles long and has a width varying from one-quarter mile at its entrance between Ballast Point and Zuninga point to a maximum of about 2½ miles at National City, east of San Diego. It is separated from the Pacific ocean by a low, narrow sand spit which extends in a westerly direction from the main-

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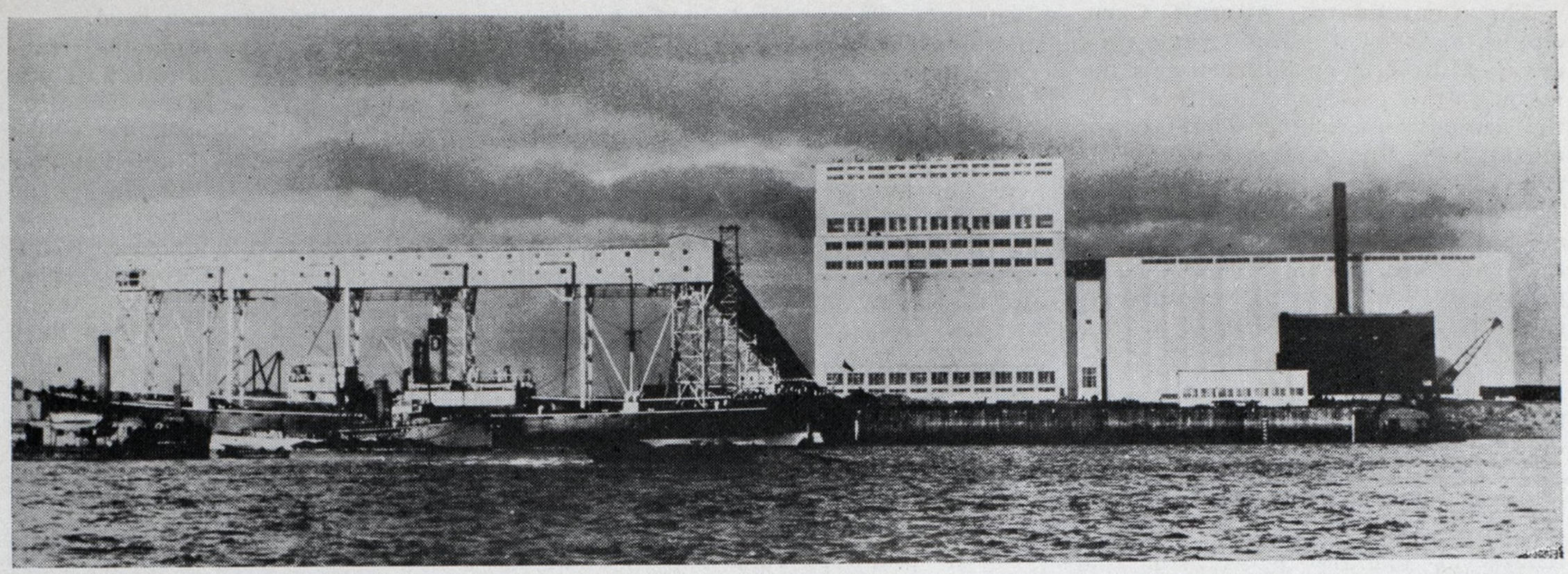
San Diego, Calif., where the California Pacific International Exposition is now being held. Important naval base



British ship loading grain at elevator, Port of Churchill on Hudson's Bay, Manitoba, Canada

CHURCHILL,

On Hudson's Bay, Canada's Newest Seaport

BY E. L. CHICANOT

IN THE early days of August, three steamers, advance guard of a fleet of 20 expected to trade out of Canada's new seaport of the north during the 1935 season, were on their way to Churchill. The S. S. NASCOPIE of the Canadian government, on her annual voyage to the eastern Arctic, and the British freighters LEOPOLD and WENTWORTH, were scheduled to enter Hudson straits on Aug. 10, official date set by insurance companies for the opening of navigation. Thereafter for a period of seven weeks or so the port of Churchill will be feverishly busy.

Port officials have predicted a 100 per cent increase over the traffic of 1933, when ten vessels docked at Churchill to load 2,736,000 bushels of grain. Shipments booked to date exceed the total amount handled during the 1934 season. The increase in inborne freight is expected to more firmly establish the position of the northern port as a distributing point for the Canadian northwest. In short Churchill is definitely promised a further share of the Dominion's maritime commerce and may with increasing justification assert her claim for serious inclusion among Canada's seaports.

Anticipate Increased Business

The promise of increased business in 1935 comes on top of what was considered an eminently successful season in 1934. Last year Churchill shipped 4,053,954 bushels of grain and 580 head of cattle, as well as 569 tons of flour and 1,223,492 board feet of dressed lumber in the 15 vessels which visited the port from Europe. The season's aggregate shipments, of course, is insignificant except in consideration of the fact that Churchill is a recent addition to Canada's list of ocean ports, that by reason of its location it can be operated for only the briefest season, and as an indication of its steadily increasing importance.

The first commercial shipments were made from the Prairie provinces' port in 1931 by the British steamers FARNWORTH and WARKWORTH which loaded 544,769 bushels of grain for London and Antwerp respectively. In 1932 ten vessels loaded at the port and again ten in 1933. In 1934, the fourth season of operation, there were 15 arrivals, the first vessel snaking its way through the ice to reach harbor on Aug. 13, and the last to depart, escaping the danger of being frozen in, sailing on Oct. 4. This navigation season of about seven weeks may be considered the average for Canada's newest port.

But while these bald facts would appear to preclude regarding Churchill in a serious way in maritime affairs, and this view largely prevailed when the railway line was being built through a wilderness to reach Arctic waters and a port was being developed, a subtle change has taken place in the popular attitude towards Churchill and there is a feeling, that after all this northern port may have a certain significance in the future of Canadian shipping.

An ocean port on Hudson's Bay for the Prairie provinces of Canada represents the materialization of a dream farmers of western Canada entertained for more than half a century and for which they agitated almost as long. They chafed at the necessity of sending their wheat and other agricultural produce over the long rail haul from the western prairies to the ports of the St. Lawrence gulf while directly north of them was the ocean, an Arctic ocean it is true, but offering possibility of a much shorter rail haul for their products and a water route which had been travelled by trading ships from Europe for about two centuries and a half. For instance from Winnipeg to Liverpool via Montreal is 4393 miles, and via the Hudson's Bay 3919 miles, a difference of nearly 500 miles,

Western Provinces Insisted

The project was violently opposed in eastern Canada on the score of impracticability, it being first necessary to construct a railroad through a virtual wilderness and the further claim that traffic in the brief season a port on Hudson's Bay could be operated would never justify the capital expenditure. The prairies never let the matter drop, however, and the agitation was so insistent and the western agricultural body had such political weight that the government was forced to capitulate and launch the undertaking. Authorization was given for the building of a railroad from Winnipeg to the Hudson's Bay and a commencement made upon this in 1910. It progressed intermittently during the next two decades, being subject to

many viscissitudes and suffering many interruptions.

Immediately after the Great war advocates of shipping facilities for the prairies on Hudson's Bay received somewhat of a setback when it was proved that wheat could be exported from Vancouver and travel to Europe via the Panama canal without suffering any deterioration from the heat. It opened up tremendous possibilities for Vancouver as an alternate route of grain shipment and reduced the cost of the rail haul on grain for export from a large part of the Prairie provinces. Since that time Vancouver has made steady progress in the export of Canadian grain, coming to rival Montreal in the proportion of the western Canadian crop handled, and the wheat crop of the Prairie provinces has tended to divide at a point near the Saskatchewan border for rail movement east and west. This development obviated any danger of congestion at the lake or gulf ports from the increasing volume of the Canadian crop.

Commercial Development Underway

The setback was only temporary, however. As Canada's northern territory became better known the potentialities of the railway under construction seemed such that it was decided to push it on to completion on the shore of Hudson's Bay. The road, in fact, penetrated a highly mineralized area which had waited patiently for attention but seemed altogether too remote to warrant it for some time. By the time the rails had been laid to within sight of the Arctic waters the Hudson's Bay railway, in the view of many economists, had been justified if the projected port of Churchill never exported a bushel of grain.

With the laying of the rails the area to be served sprung to life with the promise of becoming one of Canada's great mineral fields. Important American interests had acquired the Flin Flon mining claims and spent millions upon an elaborate development program. A branch line was constructed from the new railway to the Sherritt Gordon, another enormous mining property. These two mammoth enterprises came into production in 1930 and though conditions of the depression have held them back they are among the greatest and most important producers of copper, zinc, gold and silver in Canada. And about them have sprung up a host of satellites which have commenced to and will increasingly contribute to the territory's mineral production. Something of this development must be understood to properly appraise the significance of Churchill.

Meanwhile progress was being made upon the construction of a port at Churchill, located within the entrance of the Churchill river. This site had been selected by a commission of British engineers, appointed by the Canadian government, in preference to Nelson which presented rival claims. When the British steamers FARNWORTH and WARKWORTH arrived at the port in 1931 to launch Churchill upon its career as an ocean port they found there a rapidly developing town with dock, grain elevator and grain handling facilities, railway terminal and shops and other features of an embryonic ocean terminal. Progress has continued unceasingly since that time and the vessels entering in the 1935 season will find that a notable development has taken place in the four years since the port opened.

Churchill today is a postoffice, has telegraph facilities, and a customs office. It is connected with all parts of Canada and the United States by the Hudson's Bay railway. The harbor is owned and operated by the Dominion government, the cost of operating it during the 1934 season being $95,089. The cost of the maintenance of the government elevator alone was $46,700, fifty-two men being employed there during the season.

Churchill has a government dock, 1855 feet in length, with space for four vessels, and a depth alongside at low water of 30 feet. It has a freight shed 303 feet by 175 feet, railroad tracks along the wharf, two locomotive cranes of 15 tons and 20 tons capacity, a floating crane of 15 tons capacity, water main, and electric light and power. The grain elevator, of most modern type, has a capacity of 2,500,000 bushels. It is equipped with galleries to the wharf, and four belts and 23 spouts for loading three ships at the same time at the rate of 500,000 bushels per day. The controlling depth of the channel is 30 feet at low water and inside the harbor there is anchorage room for three vessels. Three tugs are available, two reinforced for ice and one with salvage equipment. Repair facilities consist of salvage tug and equipment, diver and diving gear, and a good machine shop.

Practicability Demonstrated

A Canadian government icebreaker is stationed in Hudson straits during the season of navigation, advising ships of weather and ice conditions. Government radiotelegraph stations, five of which are equipped with direction-finding apparatus, also assist navigation through the straits.

Churchill has steadily developed season by season as actual experience increasingly demonstrated the practicability of the route. The best impartial proof of its practicability is furnished by the fact that periodical

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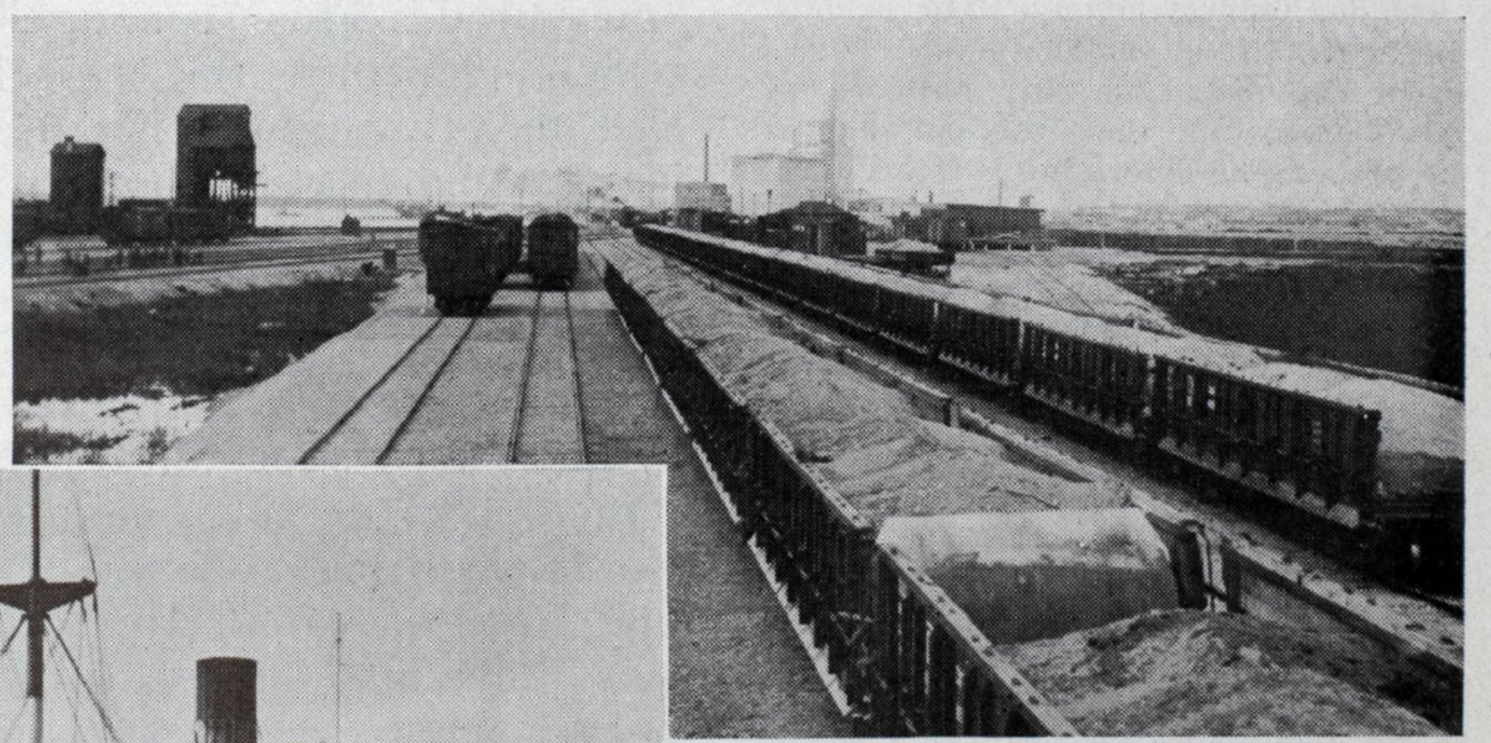
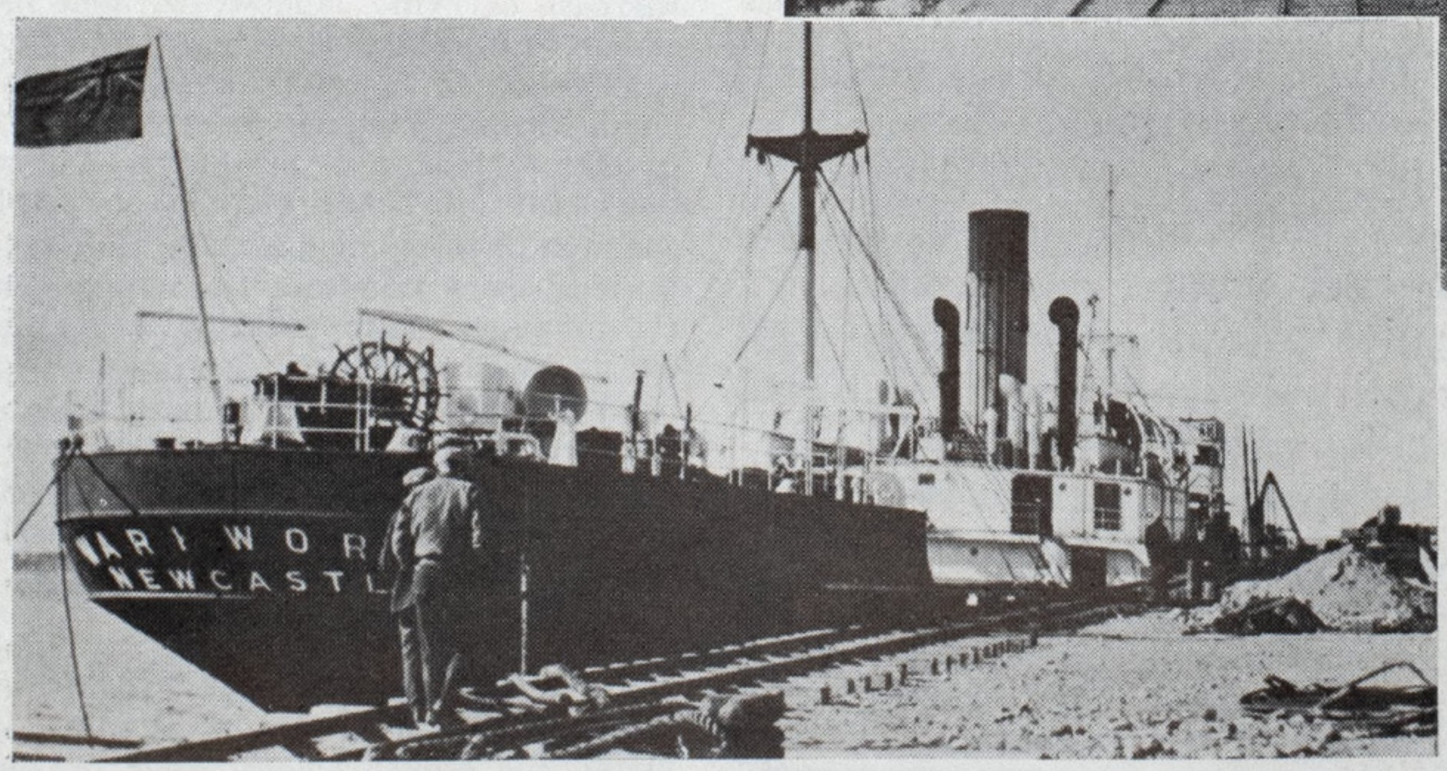




ABOVE—Hudson's Bay Railway terminal at Port of Churchill. Direct rail communication with all points in Canada and the United States, and access to the Atlantic ocean via Hudson straits

AT LEFT—British steamer Warkworth at the government dock, Port of Churchill. Open season for navigation only 7 weeks

MEASUREMENT,

Based on Internal Capacity of Vessel

THE word "ton" comes from an old English word "tun", meaning a large cask or barrel. In the early days the word was applied to large casks in which wine from France was imported into England. These were originally of such a size that they could be transported on a cart drawn by two horses, but later the capacity was made equal to four hogsheads. As these casks were of fairly definite size the number which a vessel could carry was used to indicate the ship's capacity; thus a vessel of 20 tuns was one which could carry 20 of these casks.

At one stage in history the king of England had the right of preemption, that is, of taking at about half the market value of one tun from each cargo of wine of 20 tuns or less, as an import duty. Above 20 tuns the duty was double, which had the effect of creating preponderance of 19-tun vessels in this trade.

Original Unit of Measure

This method of "tunnage" measurement could not well be applied to all commodities and various attempts were made to establish a tonnage measurement for all vessels, based on length, breadth, and depth. These were superseded by weight, which was prescribed by act of parliament in 1694, the ton of 2240 pounds being adopted as the unit of measurement. The tun of wine, containing 252 gallons, weighed approximately 2240 pounds, hence the tun or ton of weight.

In the meantime ship builders on the Thames and the Tyne had adopted a practice of determining interior capacity by multiplying together the length of keel, the maximum breadth, and one-half the breadth, then dividing the product by 94. This substituted one-half the breadth for the depth which had been used in an old formula and thus avoided the difficulty of measuring the depth of a vessel when loaded. Thus the tonnage could be determined whether the vessel was loaded or not. This "builders' old measurement rule" was incorporated in an act of Parliament in 1720.

This old measurement rule had a bad influence on the form of ships. In an effort to secure as large a vessel as possible in proportion to measurement tonnage the ships were made fuller and the depth was increased to as much as 70 per cent of the breadth instead of the 50 per cent on which the formula was based. The resulting vessels were ugly, full, narrow, and of great length. Safety was sacrificed for size. Vessels became more and more cranky and so many shipwrecks resulted that there developed general dissatisfaction with the method of tonnage measurement.

Measurement of Internal Capacity

In 1833 a British commission was appointed for consideration of a method of tonnage measurement. It reached the conclusion that such measurements should be based on the internal capacity instead of on the weight and that the cubical contents should be ascertained by the smallest number of measurements necessary to obtain the result. After further consideration George Moorsom, naval architect and secretary of a measurement commission appointed in 1849, devised a new method of determining the cubical contents of a vessel. His method met the approval of shipowners and shipbuilders and of the commission and was adopted in 1854. It provided for a series of divisions and subdivisions at the points at which the measurements were taken and established 100 cubic feet as the official ton, a figure which produced approximately the same result on an average as had been produced under the builders' old measurement rule. The Moorsom system has remained in use and has been adopted by all the maritime nations as well as the Suez canal and the Panama canal for the underdeck tonnage.

In a pamphlet, *Tonnage Measurement*, by A. Van Driel, from which most of the foregoing information was abstracted, is quoted the following from Mr. Moorsom in support of the system of internal measurement:

"It is alleged that light merchandise (meaning thereby such merchandise as fills the hull of the vessel without wholly loading her to the load draft of water) forms the predominant cargoes of commerce, and constitutes for the most part the profits of the ship; and therefore, it is maintained that the internal capacity, on which the stowage of this merchandise entirely depends, must be the fair and proper basis for assesment. Besides, the poop, sparedecks, etc, which are appropriated entirely to passenger traffic, frequently form a large item in the profits of the ship.

"Having assumed, as affirmed to be the case by the generality of shipowners that the profits of a vessel are, for the most part directly dependent on the quantity of space for the stowage of cargo and accommodation of passengers—having assumed this as an incontrovertible condition of the question—all further investigation on the subject has gone to prove the superior eligibility and desirableness of internal measurement."

The Moorsom system was widely accepted, which seemed to assure an end of measurement troubles. Shipowners and operators, however, anxious to increase carrying capacity without increase in tonnage figures and of charges based on them, secured a decision from the house of lords in 1872 in the famous case of the steamship BEAR, that if there were a so-called tonnage opening in the deck, the shelterdeck space need not be included in the tonnage. This had a far-reaching effect, in that it has permitted ships to this day to be constructed with a shelterdeck wherein dry cargo may be stowed, without inclusion of the space in the net tonnage of the vessel.

Suez Canal Measurement System

Upon the opening of the Suez canal in 1869 it soon became apparent that the registry net tonnage as derived under the measurement rules of the

FOR levying port charges and as an index of capacity and size, every vessel is "measured." This "tonnage" which identifies the vessel and may throughout her life be changed to correspond to alterations, additions or subtractions of space, is "registered" and filed in the records of the department concerned in the country to which the vessel belongs. For transiting the Suez and Panama canals the vessels must also be measured in accordance with specific rules adopted for assessing equitably the amount of tolls to be paid. The origin and development of these rules of measurement are discussed in this article.

Editor's Note.

This discussion on tonnage measurement was prepared by the Panama Canal authorities in January, 1935. See article in March issue.

several countries was not a suitable quantity on which to base tolls charges. An international conference was called at Constantinople in 1873, as a result of which it was decided that the British method would be used as a base and all illogical provisions which had crept into the rules would be eliminated and shelterdeck space would be included in the tonnage, regardless of the so called tonnage openings.

This necessitated each vessel's being provided with a special Suez canal certificate showing gross and net tonnage under Suez rules. It was hoped that these would be adopted as international measurement rules for deriving registry tonnage but this could not be accomplished. The rate per net ton as determined by the Suez rules was to be established by the board of directors of the Suez Canal Co. as conditions might warrant, and rates have been adjusted rather frequently; in the 20 years since the opening of the Panama canal they have changed 15 times.

Panama Canal Measurement

In anticipation of the opening of the Panama canal, congress passed the Panama canal act of Aug. 24, 1912, to provide for the opening, maintenance, protection and operation of the canal and the sanitation and government of the Canal zone. Section 5 of the act (as amended by the act of June 15, 1914, and now in effect), authorizes the President to prescribe and from time to time change the tolls which shall be levied by the government of the United States for the use of the canal and stated that tolls may be based upon gross or net registered tonnage, displacement tonnage, or otherwise and that the rate of tolls may be lower for vessels in ballast than for vessels carrying passengers or cargo. The act further states that "when based upon net registered tonnage for ships of commerce the tolls shall not exceed $1.25 per net registered ton, nor be less than 75 cents per net registered ton." It was also provided that "the toll for each passenger shall not be more than one dollar and fifty cents."

The secretary of war had already appointed Dr. Emory R. Johnson, of the University of Pennsylvania, as special commissioner on Panama canal traffic and tolls and directed him to "formulate rules and regulations governing measurement of ships going through the canal and to make an investigation regarding the tolls to be charged." Dr. Johnson's report was called by the commissioner of navigation of the department of commerce at that time "the most thorough treatise on admeasurement in any language" and his system of measurement "the most exact application of the scientific principle which should govern the subject, yet prepared."

Following the passage of the Panama canal act the President issued a proclamation on Nov. 13, 1912, announcing that the tolls rate on merchant vessels carrying passengers or cargo would be "one dollar and twenty cents ($1.20) per net vessel-ton for each one hundred (100) cubic feet of actual earning capacity" and that on vessels in ballast without passengers or cargo the rate would be 40 per cent less than the rate of tolls for vessels with passengers or cargo.

Law Limits Maximum Tolls

About a year later, following the completion of the study by Dr. Johnson and his formulation of rules for the measurement of vessels, the President issued a proclamation on Nov. 21, 1913, prescribing and proclaiming the rules for the measurement of vessels for the Panama canal. These were the rules for determining the "net vessel ton—each 100 cubic feet," on which the tolls prescribed in the proclamation of Nov. 13, 1912, were to be based.

On the opening of the canal to commerce on Aug. 15, 1914, the canal administration proceeded to levy tolls in accordance with the two proclamations of the President, that is on the net tonnage determined by the Panama canal rules of measurement and at the rates prescribed in the proclamation of Nov. 13, 1912. West coast lumber interests protested that a charge for deck loads as made in accordance with these rules would in effect increase the tolls charges on a vessel beyond the limits set by the act of Aug. 24, 1912, as amended which provided that, "when based upon net registered tonnage for ships of commerce the tolls shall not exceed $1.25 per net registered ton," and the further provision in the act that, "if the tolls shall not be based upon the net registered tonnage, they shall not exceed the equivalent of $1.25 per net registered ton, as nearly as the same may be determined."

The whole matter was referred to the attorney general of the United States for interpretation. He rendered an opinion that the term "net registered tonnage," as it appeared in the act, referred to the net registered tonnage under United States rules of measurement, and that any tolls charges, with or without deck load, which exceeded $1.25 times the net tonnage under United States registry measurement rules, were not collectible.

Dual Measurement System

This created a situation in which tolls charges were based on one form of tonnage, the Panama canal net tons, with a limiting feature based on another and different tonnage, the United States net. This has been termed the "dual system." It was immediately recognized as unsatisfactory and inequitable because of the variations in the United States net measurement of vessels of approximately equal interior capacity, and because it prevented making the charges on a vessel in ballast 40 per cent less than on the same vessel when laden, except in the extremely rare case in which the canal and United States methods of measurement might produce approximately the same figure for net tonnage.

That the President considered the situation unsatisfactory and probably detrimental was indicated in his letter of Feb. 15, 1915, to the secretary of war in which he stated, "If the congress shall alter the existing law upon the subject there will perhaps be opportunity to deal with it more completely and satisfactorily; but until that course is taken the way herein suggested seems to me the best one to meet the existing situation."

The effects of the system, it developed, were worse than anticipated. Prior to the beginning of the World war the exemption of shelter deck spaces and superstructures was not permitted under the United States rules of measurement, regardless of tonnage openings. As a result of the war many vessels of foreign registry were allowed to come under the American flag, under emergency regulations, and with the acceptance of their net tonnage as established under foreign systems. These vessels therefore enjoyed exemptions of shelterdeck and other superstructures by virtue of their registry documents, a privilege not accorded to regular United States vessels.

Tonnage Exemption Allowed

To equalize this situation the bureau of navigation of the department of commerce issued a bulletin under date of March 16, 1915, which modified the United State rules of measurement and set forth the conditions under which any United States vessel could claim exemption of these spaces. These were practically the same as under the British regulations and had the effect of allowing vessels to decrease very markedly their net tonnage under the United States rules of measurement.

As such measurement of net tonnage was very much less than net tonnage (actual earning capacity in units of 100 cubic feet) under the Panama canal rules, the reduction in United States measurement of net tonnage lowered the tolls of these vessels at the Panama canal. During the earlier years, however, the foreign ships benefited more than those of the United States as they already had the necessary installations to qualify for exemption of spaces, while the United States vessels, built for registry under a different system, had to be reconditioned to effect the changes requisite for securing exemption.

MARINE TERMINAL

For Handling Petroleum Products

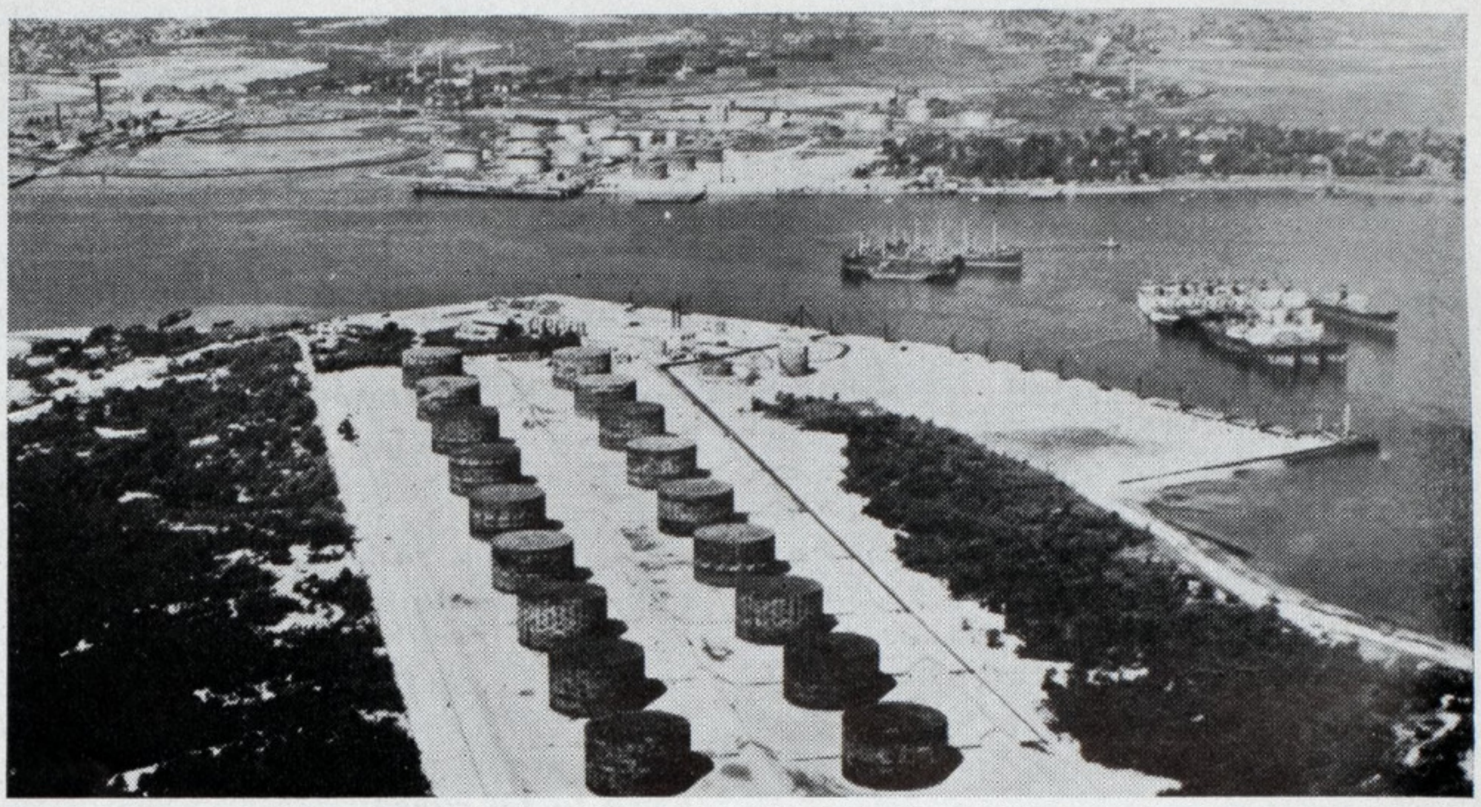
ON July 18 the Socony Vacuum Oil Co. officially opened Port Socony, Staten Island, N. Y., said to be the world's most modern marine terminal for handling petroleum products. It is also one of the largest projects of its kind in this country. It will be the focal point for the company's marine operations on the eastern seaboard and will be the clearing point for cargoes brought from Texas and the West coast by the company's large fleet of tankers. The terminal covers an area of 257 acres. From this terminal petroleum products will be shipped by barge to the main centers of New York and New England. This will facilitate handling, and through centralization, cut out many hitherto necessary steps, thus saving much time and expense. The new port has a capacity for handling more than a quarter of a billion gallons of petroleum products during a 12-month period.

The terminal has been under construction for almost a year. There are 39 tanks, 19 buildings and over 8 miles of pipe line. The storage capacity is approximately 60,000,000 gallons. The terminal was designed and constructed with a view to simplicity and operating efficiency. It is estimated that between 95 and 100 ships' cargoes will be handled during the period of a year. This is exclusive of barge activities which will be practically continuous.

Steel Bulkhead Construction

Although, at first, consideration was given to a system of timber walls at right angles to the shore for parallel berthing, this plan was abandoned in favor of a steel bulkhead. In this way a saving was made because the timber walls would entail high maintenance charges and would also introduce fire hazards. By this system of construction, no less than 19 acres of land were reclaimed between the bulkhead and shore. The bulkhead construction was also found to be more suitable for economical marine operation than piers built out at right angles to the shore line because of the many pipe lines which had to be accomodated. This amount of piping together with derricks and necessary clear roads would have necessitated very broad pier structures, the cost of which combined with the dredging would have been prohibitive.

The bulkhead frontage is 2000 feet long on the bulkhead line, with returns at the north and south ends totaling about 1000 feet more. One thousand feet of the frontage is built for 30 feet at mean low water. The balance is constructed for 21 feet at mean low water except that the northerly 500 feet is dredged to 15 feet at mean low water. The berth is 300 feet wide and the approach channel is 400 feet wide, and is dredged for about 1000 feet to reach deep water.



Port Socony, Staten Island, N. Y. Modern terminal for handling petroleum products, recently completed for the Socony-Vacuum Oil Co.

The steel sheet piling is of the deep arch inter-locking type. Back-bracing for the 30-foot section consists of 2½-inch rods located 8 feet on centers, each attached to a back anchor group consisting of two vertical piles and two drag timbers. The total length of sheet piling for the 30-foot section is 56 feet which gives a penetration in tough gravel of 15 feet, as the distance from mean low water to grade is 11 feet. The 21-foot section of 45-foot piles was similarly constructed, except that the back anchorage was reduced to three piles—two vertical and one batter.

The fender system consists of oak piles 10 feet on centers, with a lower wale and top wale construction. The latter consists of one 10 x 10 feet, 10 x 14 feet, and 6 x 10 feet, all of oak, bolted to the steel construction of the sheet piling and to each other. Care was taken in dredging to deposit good material only.

Before deciding upon the final arrangement for tankage, numerous studies were made for tank locations and grouping. Among the important features considered was maximum gravity head to eliminate pumping to barges. The swing pipes consist of three sections of Naylor pipe with malleable fittings actuated by a winch and by cable running through the liquid seal cable box. The terminal elbows of the swing pipes look down, a feature which makes it possible to draw off practically all of the tanks' contents through the main line. Each tank is equipped with angles welded to the shell to assist in the handling of a portable foam tower.

Piping Layout Simplified

A 12-inch pipe line has been installed for each product with branches to the tanks at each dike enclosure. Care was taken in grading the piping to avoid pockets and to make certain that all the contents in the tank could be run out by gravity. On leaving the tank field, the lines, exposed, head direct to the bulkhead and then run, buried, parallel thereto. There are six groups of connections for steamers and eight groups for barges. The steamer connections consists of 8-inch branches from the 12-inch main lines, which lead into Siamese connections with two 6-inch lubricated gate valves. The barge connections are single 6-inch valves connected to 6-inch branches from 8-inch feeder lines which are used for the north half of the bulkhead.

The installation of two valves per connection at steamer groups enables these vessels to discharge through two 6-inch connections. Eccentric increasers and Y's have been provided to permit the use of one 8-inch hose or a 6-inch and an 8-inch hose. This flexibility is of considerable importance in practical operation.

Each group has a 6-inch connection to the 12-inch slop line, which parallels the wharf, and which is lead to a 15 x 25 feet slop tank. All pipe runs are welded; in fact, welding was used in every instance as this method of construction is economical and certain. All exposed piping is supported on welded pipe bents in concrete footings.

Attention was given to possible transfers of product, and to allow for this, plugged T's were placed in each line abreast of every take-off in the main pipe alley to the tanks. Proper anchorage for the piping was provided. After six months of operation, the piping shows no buckling or creeping, despite the fact that the runs along the pipe alley is 2500 feet beyond the anchorage. Proper provision was made at connections for the movements of lines. Swing joint assemblies are used.

The piping grades uniformly down along the pipe alley to the bulkhead. It has been found that water in product from ships lurks in the lines along the bulkheads, and to provide for this, a large steel drain box is installed at the extreme north end of the lines. Lines can be drained hrough a plug cock into this box which is provideo with a drain through the bulkhead to draw off the water.

So that products might be interchangeable beween tanks, two 1000 gallons per minute Worthington rotary pumps, driven by two vertical Troy steam engines were installed. Each pump is connected to a manifold—one for the gasoline and the other for the fuel oil and slop.

Steam Producing Plant

For providing steam, there are two 350-horsepower Connelly watertube boilers housed in a galvanized steel boiler house. Each boiler is fitted with two Parsons burners for burning fuel oil. The feed water system consists of duplicate feed pumps drawing from a Worthington open type feed water heater. Raw water is taken from a point 2000 feet distant, through a metered 4-inch cast iron line. Steam at 15 pounds pressure is supplied to all welded heating coils in the tanks. The wharf is supplied with steam at 150 pounds pressure, with connections to the main line at regular intervals, for pumping out barges and cleaning ships' tanks. Steam is also supplied to the buildings and to the pumps in the pump house. Exhaust lines from all pumps, except those for emergency use only, are connected to the feed water heater and the steam utilized.

Fire Protection System

Both fresh and salt water fire lines have been installed. An intake line of 15-inch outside diameter, wrought iron pipe receives water from the sea through an intake box welded to the steel piling, with the center of the pipe inlet at 4 feet below mean low water. This line is connected to a 2000 gallons per minute Lecourtenay fire pump driven by a steam turbine located in the pump house.

An 8-inch dry discharge line is carried along the pipe alley with four-way hydrants located at 250 feet intervals. The line is also carried to the wharf, where it runs parallel for the entire length of the frontage, with fireboat connections at regular intervals. Branches are taken off to hydrants located in the vicinity of the aviaion tank, filler tanks and buildings. There is also an 8-inch dry fresh water fire line, connected to the 12-inch city main in Arthur Kill road.

Three reel houses containing 500 feet of hose, nozzles and a No. 15 Foamite generator and a supply of powder are located along the east face of the tank field.

Actual experiments on full size tanks has shown that maximum efficiency of foam application is obtained when the foam is applied on the surface of the oil rather than dropped on it from a height, as is the case for the conventional foamite boxes located at the roof angle. It is also known that foam cannot be carried through pipe except for a relatively short distance as its body breaks down, and for this reason separate lines for the "A" and "B" powders are usually employed where the foam is to be carried for any great distance. It is also known that foam can be forced through product with no loss of body or effectiveness. Therefore, a dry powder foam system based on these premises was installed. Full sized tests with the system on foam flows have been very satisfactory and it has been approved by the New York fire department.

The terminal embodies a number of other interesting features in connection with the storage and economical handling of petroleum products. Buildings of the plant consist of 16 steel framed houses for various specific purposes referred to above. There are also three larger buildings of brick and steel construction—the marine administration building of two stories, a large one-story warehouse and a garage and office building. The elecrical and mechanical equipment of the terminal is complete and of the most modern type.

The fleet of the Socony Vacuum Oil Co. during 1934 transported more than 45,000,000 barrels of crude oil and refined products. This fleet includes large ocean-going vessels with a total of almost 800,000 deadweight tonnage. For inland waterways and harbor transportation the company also operates 21 self-propelled barges, 140 towing barges and 25 tugs, which handle more than 57,000,000 barrels of oil a year.

The two recently completed ocean-going tankers SOCONY-VACUUM and MAGNOLIA, sisterships, will use the new terminal, which has been named Port Socony, as their eastern terminal.

A new diesel engine exhaust valve, known as the Scrim-National, has been placed in production by the National Forge & Ordnance Co., Irvineton, Pa. It is hollow forged in one piece, with no welds or plugs, from Nationalloy, that company's heat and corrosion resistant material. The seat is hardened by a special process.

The use of the one-piece, hollow forged design makes it possible to keep these valves at low operating temperatures by either the metallic salt filling or the circulating water methods. The new valve is made in all sizes and designs for use in standard diesel engines above 3½ inches in head diameter.

Tanker Atlas discharging cargo at Port Socony, Staten Island, N. Y. One of the world's largest petroleum marine terminals

Berkley, Diesel Drive Ferry, All-welded Steel Hull

DESIGNED to meet specific requirements, the all-welded, double-ended, diesel ferryboat BERKLEY was recently completed by the Norfolk Shipbuilding & Drydock Corp., Norfolk, Va., for the Norfolk County Ferries. Aside from other operations, this ferry, which is not large, makes the run from Portsmouth, Va., to Berkley, Va., and replaces an obsolete side-wheel vessel. This line, which is operated on a non-profit basis, covers a very irregular course and must carry passengers, both white and colored, separately in cabins on the main deck. Also heavy trucks must be carried and landings must be made at the docks used for the larger boats. The schedule calls for three round trips each hour over a three-quarter-mile run

Economy of operation was a primary consideration and the new vessel operates with a crew of four men—pilot, engineer and two deckhands. Operation began on June 4 and the first month's operation indicates that the fuel cost is only 11.6 cents per hour, or less than 2 cents per trip, one way. The cost of fuel, water and oil for operating the small steam ferry was $1.03 per hour and it was necessary to carry five men all told in the crew.

Pilot House Control

The BERKLEY was designed by Eads Johnson, naval architect, New York, and represents the latest refinements and most modern practice for vessels of her type. A distinctive feature is the pilot house control which makes for more efficient operation and easier landings.

The principal dimensions are: Length overall, 80 feet; beam molded, 34 feet; depth molded, 11 feet; and draft, approximately 6 feet. The steel hull is divided into five compartments by four watertight transverse bulkheads. Two longitudinal trusses of diagonal framing and channel uprights run the full length of the vessel, 10 feet, 6 inches off each side of the centerline. These trusses absorb the stresses on the main deck when loaded with heavy trucks and cars.

Electric welding was used throughout in the hull construction. The frames, beams and stiffeners were toe-welded to the plating, thus increasing the efficiency of the section with no additional weight. All plate laps and butts were welded continously inside and out. The main deck plating in the teamway is of pattern plate type throughout which gives good traction for vehicles, and also greater safety for passengers. This deck is flat with no sheer or camber.

Port and starboard of the teamway are steam heated, ventilated and well lighted cabins for white and colored passengers. The seats in the cabins have built-in lockers, providing storage space for life preservers. The floors are covered with linoleum. Wheel guards run the entire length of the teamway for added safety to passengers.

Two ladders provide access to the boat deck on which is fitted one 16-foot metallic lifeboat. On this deck are also located ventilators to the engine room and exhaust stacks from the engine and steam boiler. Ladders from this deck give access to the upper deck which is raised about four feet above the boat deck and accomodates a 10 x 8-foot pilot house of wood construction, with windows sliding in lead pockets on brass pipes, giving an unobstructed view. The pilot house is equipped with two sets of hand steering wheels (one for each end), engine controls, speaking tubes, electric bells, engine speed indicator, two compasses and rudder locking devices.

Main Propelling Machinery

The main propelling machinery consists of one, direct reversible, mechanical injection, six-cylinder, Fairbanks-Morse marine diesel engine, 10 x 12½ inches, developing 210 horsepower at 360 revolutions per minute. This engine is of the new back flow, scavenging type giving a fuel consumption 0.38 pound per horsepower per hour. Thrust bearings of ball type are fitted fore and aft of the main engine with a flexible coupling at one end. This coupling is designed to take care of shaft expansion rather than a misalignment.

A three-bladed, 4 feet, 6 inches diameter, cast bronze propeller of special design is fitted to each end of the propeller shaft. These propellers were made by F. Ferguson & Son, Hoboken, N. J. At full power the speed of the ferry is 10 miles per hour. Both stern tubes are fitted with Goodrich cutless rubber bearings.

Auxiliary power is supplied by one 10 horsepower, single cylinder diesel engine, direct connected to an electric generator for emergency lighting, one air compressor and one rotary fire and bilge pump, all of which are mounted on a common bedplate. When the auxiliary set is shut down lights are furnished by a bank of 110-volt, 213 ampere hours capacity, Exide storage batteries.

Included among the other equipment installed are: A single panel Listenwalter switchboard, mounted on the engine room bulkhead, Zenith superduplex strainers for the fuel and Weston electric tachometers and direction indicators, mounted in the engine room and in the pilot house.

Boiler for Heating

One Ideal steam boiler supplies heat to the cabins and the pilot house. There are four starting air tanks, necessitated by the short duration of the run which is approximately 6 minutes. To carry the fuel oil there are two tanks each of 1000 gallons capacity installed in compartments on opposite sides adjoining the engine room. These tanks are connected by equalizing pipes.

Two 25 gallons capacity lubricating oil tanks are installed in the engine room. There is also a 1000 gallon fresh water tank for boiler feed and a 100 gallon fuel oil day tank connected to the boiler burners with a hand pump and piped to the main fuel oil tank.

The engines are cooled with sea water, suction valves on heavy cast steel nozzles being provided. A water washed 10-inch, Yankee exhaust silencer is fitted vertically with 10-inch exhaust stack carried well up above pilot house. A ladder and closed companion way, on each side, lead up from the engine room to the main deck with steel doors in the teamway bulkheads. An engine room hatch is fitted in the main deck directly above the engine.

This vessel was built to the requirements of the American Bureau of Shipping and the United States steamboat inspection service. The capacity fully loaded is 6 automobiles and 200 passengers.

Mooney Elected Chairman

Franklin D. Mooney has been elected chairman of the Atlantic, Gulf & West Indies Steamship lines succeeding H. H. Raymond, recently resigned. Mr. Mooney has been president of this company for the past 14 years, and Vincent K. Hull was elected to succeed him in that capacity. The Atlantic, Gulf & West Indies Steamship lines and its subsidiaries include the Clyde-Mallory line, the New York and Porto Rico line, the New York & Cuban Mail Steamship lines and the Southern Steamship Co.

Mr. Mooney's shipping career covers more than 40 years, since he first entered the Porto Rico line. He has long been an outstanding figure in shipping circles and has always fought for a strong American merchant marine. He has been active in the affairs of the American Steamship Owners' association; and is a member of the board of managers of the American Bureau of Shipping, and of the American committee of Lloyd's Register.

Mr. Hull first joined the Porto Rico line in 1906 and was placed in charge of the line's freight traffic department in 1909. During the war he was a member of the shipping and control committee of the United States shipping board. He was elected vice presi-

dent of the Porto Rico line in 1927, and in March of this year he was elected vice president of the Agwi lines of which he now becomes the head.

Freight Traffic Manager

P. E. McIntyre, freight traffic manager of the Baltimore Mail line, at Baltimore, has been appointed western traffic manager of the Roosevelt-International Mercantile Marine Co., with headquarters at Chicago. He succeeds J. D. Roth, who retires on Sept. 1, after 46 years of service with the company.

In his new post, Mr. McIntyre, who is well known in shipping circles, will be responsible for the freight traffic of the United States, American Merchant, Panama Pacific, Baltimore Mail, American Pioneer, and States Steamship lines.

From the territory under his charge comes a large proportion of exports of the United States, both in tonnage and in value. Development of freight traffic in this field by personal contact has become of increasing importance. Shippers are now exercising a more definite control and supervision over their foreign traffic.

Craig Elected Chairman

John E. Craig, vice president of the Clyde Mallory lines, who has been in the service of the Atlantic Gulf and West Indies lines since 1904, was, on Aug. 1, elected chairman of the American Steamship Owners' association. His election at a special meeting held at the headquarters of

John E. Craig

the association, 11 Broadway, New York, was unanimous.

Well known in shipping circles for many years, Mr. Craig has long been active in the affairs of the American Steamship Owners' association, where he has served on many committees appointed to study problems affecting the American merchant marine.

Mr. Craig joined the New York & Porto Rico Steamship Co. in 1904 in the passenger department, and following rapid promotions he was in 1916 elected a vice president of the organization. In 1927 he was elected vice president of the Clyde Mallory lines.

R. J. Baker is president of the American Steamship Owners' association.

Rees Appointed Manager

E. P. Rees has been appointed general manager of Furness, Withy & Co., at New York. He is only 39

E. P. Rees

years old, and has been with the company 23 years (except during the war), ever since he started as office boy in Cardiff, Wales in 1912. In August, 1914 he resigned to enlist with the Royal engineers. When he was mustered out in 1919 he held the rank of captain, and immediately returned to the employ of Furness, Withy & Co.

He has received a thorough grounding in the intricate problems of international shipping and today is recognized as one of the leading experts in this field. After 18 months in the Paris office of the company, he came to New York in February, 1921 as assistant manager of the chartering department, and he soon became manager of the department.

His responsibilities were constantly increased and on Jan. 1 last, he was appointed assistant director of the company for the United States to succeed W. J. Love who had retired. H. C. Blackiston, director at the time has also retired, and has been succeeded by Henry S. Smurthwaite.

As general manager, Mr. Rees is now in charge of all of Furness, Withy's world-wide operations from the United States. The services for which he is responsible, include the Furness-Prince line, operating from New York to the Far East, while other branch serves the East coast of South America. A number of transatlantic cargo lines, as well as the Boston-Liverpool service. But perhaps the best known of the lines that he will now handle are the Furness Bermuda line, operating the two new liners QUEEN OF BERMUDA and MONARCH OF BERMUDA, between New York and Bermuda; the Furness Red Cross Line, operating between New York, Halifax, and St. Johns; and the Furness West Indies lines, operating between New York and the West Indies.

Mr. Rees was born in Cardiff, Wales, is married and lives at Huntington, Long Island, N. Y.

Dickerson N. Hoover Retires

After 30 years in the government service, beginning as a clerk in the United States Steamboat inspection service, and becoming supervising general of that service, and after consolidation with the bureau of navigation serving as assistant director of the bureau of navigation and steamboat inspection, Dickerson, N. Hoover, has been retired. Capt. George Fried, supervising inspector of the second district, New York, has been prominently mentioned as his successor.

General Hoover conducted the extensive investigations of the bureau following the MORRO CASTLE and MOHAWK disasters. He carried them

Dickerson N. Hoover

through with the same application and devotion to duty which have always characterized his activities throughout his long service with the government.

Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review
By Harry Bowne Skillman
Attorney at Law

THE statute requiring a shipowner bringing alien to United States" to prevent landing of the alien at a place other than that designated by immigration officers was held applicable, in the case of MANUEL ARNUS, 75 F. (2d) 943, where a stowaway was discovered en route, so that the shipowner was subject to the statutory penalty, where the stowaway escaped at the port of New York after the chief officer of the vessel was directed to deliver the stowaway at the immigration station on Ellis Island.

* * *

FERRYBOAT proceeding in a fog at half speed, i.e., four knots which was too fast to enable her to stop within the limit of visibility, about 100 feet, as well as a barge whose bargee answered the ferryboat's fog signal by hammering with a stick on an old dishpan four or five times, while standing in a doorway of his housing, held at fault for collision. Ordinarily the dishpan was used around the stove, for ashes. The barge was carrying a cargo of apples, and having in mind the time of year, it is thought that the stove was in use, and that the dishpan was probably also serving its accustomed purpose, which would somewhat restrict its functions as a medium of reverberations.—HOPATCONG, 8 Fed. Supp. 327.

* * *

IN THE case of TUXEDO, 8 Fed. Supp. 344, the court held that a ferryboat, making slow speed no greater than the speed of another ferryboat, with which she collided in a dense fog, after stopping her engines and reversing on hearing the other boat's fog signal abaft the former boat's beam to starboard as the boats neared each other on converging courses, held not at fault for the collision. Neither vessel was ahead of the other as they came mutually into sight.

* * *

TUG towing a barge together with the barge sunk with cargo held the "vessel" within the limitation of liability statute, permitting a shipowner to limit the extent of liability incurred (without privity or knowledge of the owner) to "the amount or value of the interest of such owner in such vessel, and her freight then pending," as against the contention that the word "vessel" included all barges in a flotilla which belonged to the owner of the sunken barge and the tug. In the instant case (Hockley v. Eastern Transportation Co., 9 Fed. Supp. 411), the owner's liability for "freight then pending" was limited by the court to what the sunken barge would have earned under the charter party if the voyage had been completed, and earnings of the tug arising from the towing of other barges to their destination in flotilla were included; value of the vessel and her freight then pending should be determined at the completion of the voyage which is broken up.

* * *

PILOTS of vessels are charged with the duty of being familiar with all dangers that are permanently located in the course of a river, as sand-bars, snags, sunken wrecks or trees, or abandoned vessels or barges. All this he must know and remember and avoid.—Matheson v. Norfolk & North American Steam Shipping Co., 73 F. (2d) 177.

* * *

STEAMSHIP company transporting an excludable alien to this country in the hope or belief that he will be admitted in the discretion of the secretary of labor does so at its own risk, it was declared in the case of Transatlantica Italiana v. Elting, 75 F. (2d) 970. The court said, further: "Except when exempt from the reading test, an illiterate alien who comes here to reside either permanently or temporarily is admissible only in the discretion of the secretary of labor. Whenever in such cases the secretary of labor justly decides that reasonable precaution prior to foreign embarkation would have enabled the steamship company to have detected illiteracy and such alien is nevertheless brought here, it is subject to the penalty. The excluding disability is illiteracy, and it is the neglect to ascertain that condition which is the basis of the imposition of the fine. Of course, illiterate aliens who are exempted from the reading test are not barred if otherwise admissible. Such exemption requires proof of a continuous residence of five years immediately antedating the last departure from this country and a return within six months. The previous residence is not sufficient if its continuity is broken by more than six months."

* * *

INBOUND and outbound vessels in the main channel leading from Hampton roads to Chesapeake bay and the Virginia capes were proceeding on parallel courses, which would have enabled safe starboard to starboard passing, it was disclosed in the case of DISTRICT OF COLUMBIA, 9 Fed. Supp. 487. The inbound vessel suddenly and without timely warning turned directly and quickly across the outbound vessel's bow, and did not heed the danger signal of the outbound vessel, which swung sharply to port from midchannel, thereby lessening the force of the collision. In holding the inbound vessel, solely at fault for the collision, the court held that the inbound vessel, desiring to cross the channel to make a landing, should have crossed under the stern of the outbound vessel, and, when she received the danger signal, she should have stopped and reversed, if necessary.

* * *

CHARTER party involved in the case of HALO, 9 Fed. Supp. 963, required the charterer to select a place for loading cargo where the steamship could always lie afloat. It was held by the court that the charterer was liable to the owner for damage to the hull caused by resting on bottom while at a berth. "If the grounding, though a breach of covenant by the charterer, was brought about by act of the owner or some one for whom the owner was responsible, there would be no liability on the charterer's part," declared the court. However, the court further held that the charterer could not escape liability of the ground that the grounding was caused by the master who took an excessive quantity of cargo on board, where, under the charter, the owner was obliged to receive a "full and complete cargo," and the master took on 81,000 barrels of oil which was within the warranted capacity of 75,000 barrels with "10 per cent margin more or less." Nor could the charterer escape liability on the ground that the master failed to take soundings, as the charterer contracted to direct the ship to a safe berth and the master was assured by the port captain, who represented the charterer and who picked the berth, that the berth was safe.

Marine Business Statistics Condensed

Record of Traffic in Foreign Trade at Principal American Ports

New York

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
June, 1935	446	2,123,325	457	2,169,623
May	338	2,059,686	476	2,194,913
April	460	2,823,172	460	2,297,895
March	424	2,151,900	454	2,240,198
February	368	1,846,603	384	1,813,244
January	412	2,069,982	440	2,131,740
December, 1934	424	1,928,702	401	1,896,182
November	412	1,834,078	427	1,944,737
October	429	2,080,505	413	2,027,222
September	403	2,125,445	400	2,067,354
August	439	2,354,288	470	2,458,165

Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1935	141	444,659	141	445,471
June	143	448,611	140	474,146
May	149	455,196	157	494,182
April	158	473,766	148	464,016
March	144	453,643	140	449,186
February	102	312,963	119	384,859
January	105	336,019	116	376,343
December, 1934	125	396,724	127	416,978
November	118	355,338	121	355,754
October	128	391,788	142	440,734
September	110	342,094	122	382,412

Boston

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
June, 1935	153	407,049	124	344,556
May	157	503,572	160	503,808
April	122	429,195	124	457,417
March	124	447,541	126	446,456
February	104	385,520	107	394,441
January	116	445,990	114	427,402
December, 1934	121	452,109	129	479,607
November	124	447,502	115	437,062
October	127	498,892	125	500,447
September	141	514,706	145	528,039
August	164	605,680	164	603,528

Portland, Oreg.

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1935	31	120,912	33	128,518
June	26	97,369	25	92,030
May	32	121,173	31	116,738
April	29	105,011	32	115,386
March	37	143,915	37	144,379
February	41	160,445	45	175,091
January	45	157,562	45	158,661
December, 1934	40	149,728	50	187,452
November	45	175,245	45	169,005
October	48	183,575	47	182,669
September	29	111,782	41	147,290

Portland, Me.

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1935	18	25,596	17	22,728
June	20	31,292	20	33,342
May	15	19,747	14	21,319
April	11	27,747	11	23,129
March	10	24,475	9	21,745
February	11	23,834	12	27,693
January	12	31,676	10	25,804
December, 1934	12	24,738	16	37,026
November	21	41,916	19	34,399
October	19	34,735	17	28,611
September	16	35,064	15	34,285

Providence

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1935	13	31,908	9	18,779
June	6	14,226	5	10,858
May	5	13,206	6	20,240
April	6	20,333	3	6,596
March	6	20,792	4	14,033
February	5	22,152	6	25,619
January	4	12,463	7	20,586
December, 1934	1	2,316	4	13,221
November	4	9,158	4	9,005
October	4	12,988	1	1,901
September	4	13,022	3	8,842

San Francisco

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1935	156	692,261	163	711,768
June	153	676,557	164	703,968
May	165	734,666	168	742,901
April	161	686,156	176	707,749
March	157	684,905	163	688,194
February	100	609,987	164	669,680
January	142	638,652	162	642,411
December, 1934	152	659,210	154	628,137
November	151	664,456	175	733,150
October	152	670,992	156	663,353
September	146	614,180	160	675,941

Baltimore

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1935	115	331,909	126	358,513
June	115	354,647	104	318,929
May	119	356,505	116	347,292
April	104	316,476	104	331,839
March	100	293,568	107	325,453
February	85	267,417	92	291,094
January	86	276,468	88	286,810
December, 1934	97	299,281	95	309,991
November	88	271,778	94	288,109
October	96	282,930	100	308,916
September	91	276,111	93	284,297

Norfolk and Newport News

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1935	122	356,677	121	345,352
June	132	374,592	130	361,401
May	131	405,144	126	375,243
April	127	388,429	122	380,770
March	122	374,447	127	391,523
February	109	330,108	115	335,404
January	138	429,759	136	402,944
December, 1934	148	420,417	138	401,430
November	120	389,510	124	366,913
October	112	333,739	112	330,639
September	116	335,573	111	329,199

Mobile

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1935	46	118,084	46	104,915
June	42	106,832	44	123,966
May	51	135,639	43	111,836
April	40	112,784	39	106,734
March	45	109,978	46	112,995
February	41	102,099	36	91,813
January	46	129,386	48	135,215
December, 1934	43	111,212	42	106,660
November	38	96,522	39	106,495
October	45	135,301	42	123,063
September	36	86,368	41	103,621

Jacksonville

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1935	43	116,334	35	96,912
June	27	67,170	34	85,364
May	27	61,256	27	66,011
April	34	79,609	34	80,808
March	31	63,749	29	62,261
February	25	61,714	26	66,594
January	18	49,375	24	70,832
December, 1934	22	55,809	26	67,705
November	32	65,689	31	74,619
October	28	67,954	28	66,686
September	30	58,568	33	67,190

Key West

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1935	37	43,037	35	42,948
June	36	41,569	37	48,681
May	49	59,990	49	57,044
April	52	39,491	38	46,737
March	31	37,869	30	34,093
February	32	34,322	32	37,498
January	32	37,232	34	37,563
December, 1934	31	47,048	33	48,609
November	33	41,770	35	42,891
October	37	38,904	34	36,799
September	29	32,068	30	33,182

New Orleans

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1935	197	542,700	183	476,305
June	184	502,937	191	499,413
May	183	482,299	195	484,065
April	188	504,227	173	465,173
March	183	474,712	173	425,843
February	166	457,420	165	439,990
January	166	457,267	166	435,232
December, 1934	172	472,463	174	477,672
November	157	431,288	157	430,060
October	175	499,832	177	492,802
September	159	453,453	157	426,341

Los Angeles

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1935	233	856,769	233	815,544
June	255	837,279	201	812,904
May	265	908,224	294	908,788
April	214	807,692	209	824,533
March	248	978,707	232	932,392
February	203	782,886	196	788,189
January	199	773,531	196	771,662
December, 1934	239	899,269	222	882,697
November	226	870,032	210	878,186
October	225	856,732	203	825,348
September	214	804,221	197	791,324

Seattle

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1935	34	157,607	31	139,816
June	34	154,707	36	162,266
May	35	148,801	39	163,880
April	47	200,067	50	206,729
March	42	182,384	47	202,641
February	48	211,876	47	203,927
January	56	212,386	63	249,805
December, 1934	51	222,427	47	201,642
November	46	185,293	48	205,795
October	54	230,438	55	222,014
September	45	184,361	43	221,241

Galveston

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1935	67	195,763	66	190,599
June	82	227,942	82	238,144
May	78	221,243	77	208,359
April	76	208,534	75	208,775
March	72	197,624	70	188,227
February	66	195,014	66	188,027
January	60	177,183	62	178,500
December, 1934	66	183,518	63	177,125
November	73	204,939	76	266,065
October	79	228,912	78	227,822
September	62	191,308	66	204,334

Houston

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
June, 1935	78	301,106	74	281,068
May	78	283,922	74	258,121
April	64	234,916	60	210,474
March	64	232,928	65	218,169
February	60	210,483	53	175,387
January	71	232,409	68	217,910
December, 1934	45	159,040	47	166,241
November,	39	143,055	39	139,616
October	43	145,461	41	139,418
September	49	169,676	49	170,694
August	19	76,104	22	88,631

Charleston

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1935	13	35,019	6	21,658
June	20	59,452	12	35,629
May	16	39,756	14	34,209
April	20	48,434	8	20,276
March	15	33,456	8	23,807
February	16	42,673	16	39,011
January	20	54,969	13	34,125
December, 1934	10	25,512	14	34,304
November	16	44,046	10	26,675
October	17	47,331	13	33,850
September	9	22,984	11	32,704

Note: This table gives number and net tonnage of vessels entered and cleared in the foreign trade, direct and via other domestic ports.

Latest Data on New Marine Work

Information on New Ships Ordered—Building and Repair Contracts Let—Sales—Reconditioning—Launchings—Trial Trips

THOUGH definite action on the ship subsidy legislation is now by no means certain before congress adjourns, it is generally believed that some way will be found for the United States lines to go ahead with its plans to build a third cabin liner for transatlantic service. Another ship is needed to round out the service of the MANHATTAN and WASHINGTON which have been very successful. Because of the time necessary for building so large a vessel work must be started in the near future so that she will be ready for service at the beginning of the heavy travel season of 1937.

Gibbs & Cox Inc., New York, who, it is reported, has plans well in hand for the new liner is not prepared at this time to comment on the status of the project. It is, of course, obvious that uncertainty as to the government's shipping policy is affecting the immediate course of action.

But regardless of what congress may do with reference to shipping legislation at this session, it seems certain that the project will not be abandoned and that bids will be sought within the next two months or so and maybe sooner.

Officials of the United States lines have recently stated that there has been no change in the decision to build another vessel to operate with the MANHATTAN and WASHINGTON and that plans for the new ship are in the course of preparation.

The President has approved the allocation of $5,263,995 from the works relief program for the building of about 50 smaller patrol boats and the reconditioning of shore stations for the United States coast guard.

To Construct Breakwater

Luedtke Engineering Co., Frankfort, Mich., was the low bidder, at $434,108, in the proposals received from six companies on July 31 by the United States engineer office, Milwaukee, for constructing about 3130 linear feet of breakwater and rubble mound shore connection, and removing 700 linear feet of old pier at Kewaunee harbor, Wis.

The other companies submitted bids as follows: Edward E. Gillen Co., Milwaukee, $468,817; McMullen & Pitz, Manitowoc, Wis., $482,983; Fitz Simons & Connell, Dredge & Dock Co., Chicago, $500,040; Great Lakes Dredge & Dock Co., Milwaukee, $514,351.33; and Merritt-Chapman & Whitney Corp., Cleveland, $621,124. The government's own estimate of the total cost of this work was $410,918. As this is written no announcement of award has yet been made.

Contract has been awarded to the Kaw Point Boat & Motor Co., Kansas City, Kans., for the construction of two 40 feet, 6 inches steel launches at $5919 each for the United States engineers, Kansas City, Mo. Commonly known as pushboats, these launches are of steel hull construction with wooden cabins. They will be used for light towing service.

Engineers Request Bids For Building Lock

Bids are to be received about Sept. 17 by the United States engineer office, St. Louis, Mo., for the construction of lock No. 25, Mississippi river.

The site of the work is in the Mississippi river at Bradley Island, adjacent to Cap Au Gris, Mo., upstream about 61 miles from St. Louis, and about 241 miles above the mouth of the Ohio river.

The work is to consist of a main lock, upper gate bay of auxiliary lock, approach trestle connecting with the Missouri shore, earth filled esplanade, extending along the main dock from the lower gate bay to the upstream end of the upper guarded wall of the lock, an earth filled site extending therefrom approximately 1300 feet upstream on Bradley Island, and other incidental work.

The chamber of the main lock will be 600 feet long by 110 feet wide and the auxiliary locks will be 360 feet long by 110 feet wide.

All mitering gates will be composed of two leaves. Height of the upper gate for the main lock will be 27 feet, the lower gate 35 feet, and the upper gate for the auxiliary lock 35 feet.

Bids received Aug. 9 by the United States engineer office, Milwaukee, for dredging at Kenosha Harbor, Wis., were rejected as excessive and it is proposed to readvertise this work in the near future. Also rejected, for the same reason, were the bids received July 19, for dredging Two Rivers harbor, Wis.

The Nashville Bridge Co., Nashville, Tenn., has under construction two oil barges, 130 x 32 x 7 feet for the Gulf Refining Co., Pittsburgh.

Los Angeles Harbor

It is expected that contract will be awarded ond work started early in September on the third segment, 2000 feet, of the new 12,500-foot Los Angeles harbor breakwater extension. The low bidder was the Rohl-Connolly Co., Los Angeles, at $827,564. The work will be carried out under the direction of Capt. Theodore Wyman, United States district engineer.

The work includes dredging of 215,000 cubic yards from Reservation Point shoal to form a clay core for the new segment. The successful bidder recently completed the second segment of 4000 feet of the breakwater which brings the total length completed to 5400 feet.

First Polish Liner Ready

The new motorship PILSUDSKI, first Polish transatlantic liner, built at the Monfalcone shipyards, Trieste, will leave on her maiden voyage from Gdynia on Sept. 15, arriving in New York Sept. 24.

The first sea trials of the new liner were held on Aug. 12 at a speed of 18 and 19 knots. On the following day, the liner ran for 9 hours, fully loaded, at a speed of 20 knots. At a speed of 18 knots, the two diesel engines turned at 112 revolutions per minute; and at a speed of 20 knots, at 130 revolutions per minute. A brief summary of the characteristics of the new liner was published in the August issue of MARINE REVIEW.

Contract was awarded the Treadwell Construction Co., Midland, Pa., for furnishing and delivering 30 sections (540 linear feet) of 24-inch diameter dredge discharge pipe on its low bid of $4071. This award was made by the United States engineer office, St. Louis. Bids were opened July 29.

Northwest Yard Receives Order for Survey Boat

Lake Washington Shipyards, Houghton, Wash., was the low bidder and has been awarded contract for construction of the 117-foot, steel hull, diesel electric survey boat for the United States engineers, Portland, Oreg., at $177,000. The vessel is to be completed in 245 days. Bids were received on July 30, six West coast shipyards participating. The other bids were: Commercial Iron Works, Portland, Oreg., 265 days, $267,644; Lake Union Dry Dock & Machine Works, Seattle, 240 days, $198,838; Moore Dry Dock Co., Oakland, Calif., 240 days and $179,943; Los Angeles Shipbuilding & Dry Dock Corp., San Pedro, Calif., 270 days and $201,400; and General Engineering & Dry Dock Co., Oakland, Calif., 285 days and $186,564. The constructing officer's estimate of the cost of building this vessel was $195,000.

General particulars of the vessel are: Length overall, 117 feet, 11 inches; length molded at deck, 117 feet beam, molded, 25 feet; breadth overall, 26 feet, 7 inches; and depth molded, 11 feet, 11 inches.

The propelling machinery will consist of two diesel driven generating sets each of 225 kilowatts. The propelling motor will develop 550 horsepower continuously at 252 revolutions per minute and 424 volts. An auxiliary diesel generating set of 20 kilowatts at 125 revolutions, direct current is also to be installed.

British Aid to Shipping

How the British government's "scrap and build" program is working out is touched upon in *Commerce Reports* for Aug. 3, by M. L. Davidson, American consul at Glasgow.

Expectations have not been fulfilled, said Mr. Davidson, and shipbuilders believe that adjustments in the plan are necessary before it can materially benefit both owners and builders.

According to the terms of the plan an aggregate of £10,000,000 is available for building or reconditioning of one ton of new shipping for every two tons scrapped. On this basis government assistance is guaranteed for the construction of approximately 750,000 gross tons on condition that 1,500,000 tons are scrapped.

So far owners have been slow in taking advantage of the assistance offered by the government for new shipbuilding, and are still slower—even unwilling—to employ state aid to modernize their ships. It is obvious that the benefits are confined to those owners in possession of tonnage which can be scrapped, and the report states that in the whole of United Kingdom the shipping available for scrapping is little more than 100,000 gross tons.

In the annual repairs to the army engineers sea-going hopper dredge MANHATTAN of the Jacksonville engineer district, the Sun Shipbuilding & Dry Dock Co., Chester, Pa., remodeled the stern to permit installation of twin rudders in place of the single rudder.

To Build Patrol Boats

The United States coast guard has invited bids to be opened Sept. 3 for the construction of two 62-foot wooden hull harbor craft. Funds for the construction of these boats have been allocated under the emergency relief appropriation act of 1935.

The first boat must be delivered within 270 days after date of receipt of notice to proceed and the second within 300 days.

When the United States liner MANHATTAN sailed from New York on Aug. 14 she had completed three years of service. She carried 635 passengers which was over 100 more than on the corresponding voyage in 1934.

Since the MANHATTAN sailed from New York on her maiden voyage Aug. 10, 1932, she has made 40 round voyages. In that time she has carried 55,867 passengers or an average of 1432 on each round trip.

Sun to Build New Ferry for Pennsylvania Railroad

The Sun Shipbuilding & Dry Dock Co., Chester, Pa., has received an order from the Pennsylvania Railroad Co., Philadelphia for the construction of a ferry for service on Chesapeake bay. The new vessel will be similar to the DELMARVA, now very successfully engaged in that run. Bids for building the new vessel were received from a number of yards on Aug. 2.

The DELMARVA was built by the Pusey & Jones Corp., Wilmington, Del., and was placed in service on Jan. 7, 1934. She is 260 feet in length overall, 250 feet in length between perpendiculars, and 59 feet in beam over guards. The depth molded amidships is 19 feet, 1 inch and the draft loaded is 10 feet, 6 inches, with a displacement of 1680 tons.

The DELMARVA is equipped with two unaflow type steam engines built by the Skinner Engine Co., Erie, Pa. Each engine has four cylinders, 19 inches in diameter by 20 inches stroke and develops 1400 shaft horsepower at 200 revolutions per minute. Steam at 275 pounds per square inch and with 200 degrees Fahr. superheat is supplied by two Babcock & Wilcox cross drum, sectional header watertube marine boilers.

The DELMARVA was designed by The Pusey & Jones Corp. under the direction of W. R. Elsey, superintendent of floating equipment of the Pennsylvana railroad, with George G. Sharp, New York, as consulting naval architect. She made a speed of 18.22 statute miles per hour at 200 revolutions per minute on her trials.

While generally similar to the DELMARVA, some important changes will be made in the new ferry.

There is now under construction at the Sparrows Point plant, Baltimore, of the Bethlehem Shipbuilding Corp. one suction dredge hull, 172 feet long, 44 feet beam, 11 feet, 10 inches deep, for the Atlantic, Gulf & Pacific Co., New York. The principal contractor, who will furnish and install the machinery and equipment is the Ellicott Machine Corp., Baltimore.

Bunker Prices

At New York

	Coal F. a. s. per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
Aug. 20, 1935	5.80@5.55	1.00	4.08
July 19	5.80@5.55	1.10	4.08
June 20	5.80@5.55	1.20	4.08
May 20	5.80@5.55	1.20	4.65
April 19	5.63@5.38	1.20	4.65
Mar. 19	5.63@5 38	1.20	4.65
Feb. 19	5.63@5.38	1.20	4.65
Jan. 19	5.63@5.38	1.20	4.65
Dec. 19, 1934	5.63@5.38	1.20	4.65
Nov. 19	5.63@5.48	1.20	4.65
Oct. 19	5.63@5.48	1.20	4.65
Sept. 19	5.63@5.48	1.35	4.79

At Philadelphia

	Coal trim in bulk per ton	Fuel oil alongside per barrel	Diesel engine oil alongside per gallon
Aug. 20, 1935	5.10@4.85	1 00	4.04½
July 19	5.10@4.85	1.10	4.04½
June 20	5.10@4.85	1.20	4.04½
May 20	5.10@4.85	1.20	4.61
April 19	4.93@4.68	1.20	4.61
Mar. 19	4.93@4.68	1.20	4.61
Feb. 19	4.93@4.68	1.20	4.61
Jan. 19	4.93@4.68	1.20	4.61
Dec. 19, 1934	4.93@4.68	1.20	4.61
Nov. 19	4.93@4.78	1.20	4.61
Oct. 19,	4.93@4.78	1.20	4.61
Sept. 19	4.93@4.78	1.35	4.76

Other Ports

Aug. 20, 1935

Boston, coal, per ton	$6 62½
Boston, oil, f. a. s. per barrel	$1.13½
Hampton Roads, coal, per ton, f.o.b. piers	$4.92
Cardiff, coal, per ton	13s 9d
London, coal, per ton	—s —d
Antwerp, coal, per ton	16s 9d
Antwerp, Fuel oil, per ton	—s —d
Antwerp, Diesel oil, per ton	—s —d
British ports, Fuel oil	—s —d
British ports, Diesel oil	—s —d

Early American Shipbuilding An Important Industry

By F. B. Jacobs

SHIPBUILDING was an important industry among the American colonists and one of the earliest vessels built was a Dutch yacht named the ONREST, laid down by Capt. Adrien Block in 1614. This little craft was sixteen tons burden, 38 feet on the keel, 44½ feet long and 11½ feet beam. She seems to have been a successful vessel. Her commander Captain Hendrickson in the summer of 1616 discovered the Schuylkill river and explored the Atlantic coast line from the eastern part of Nova Scotia to the Virginia capes.

From early records it would appear that the Massachussets Bay colony built its first vessel in Medford, launching her on July 4, 1631. Her owner, Governor Winthrop, christened her the BLESSING OF THE BAY. Later the civil wars in England so affected shipping that the colonists were compelled to provide their own vessels. An active and public spirited man, one Mr. Peters, built a vessel of 300 tons at Salem. This vessel was built on subscription, a sort of joint company. Following this example various business men of Boston built a vessel of 150 tons.

Over Two Centuries Ago

From such small beginnings, a vessel built here and there as a venture, gradually developed the shipbuilding industry of the Atlantic seaboard. Of this early industry, dating back two centuries, only fragmentary records have been preserved. In 1853 John S. Barry wrote a *History of Hanover, Mass.*, in which he gives a map or diagram of the various shipyards on the North river which were active from 1660 until 1835. This river is in Plymouth county, Mass. and the shipyards all were located in a space of less than a mile between Hanover and Scituate on one side and Pembroke and Marshfield on the other.

The North river is shallow, crooked, and narrow and it was anything but an ideal location for shipbuilding. However that may be, seven generations of shipbuilders followed one another in this locality and turned out, all told, something like 1000 vessels. These vessels were mostly small craft, schooners, brigs and ships up to about 400 tons. Schooners were used on the Grand Banks for fishing, while many of the ships, that is, three-masted square riggers, were employed in the New Bedford whaling trade. Ships and brigs in considerable numbers were also built for foreign trade and not a few of these craft were sold outright to foreign nations. During the Revolutionary war and the War of 18-12 many privateers were built.

A great deal of trouble was experienced in launching comparatively large craft. The method followed was to attach two scows called gundaloes (which is probably a corruption of gondola) to the stern and two to the bow of the vessel at low water. Then when the tide rose the scows lifted the vessel with it. In this manner the larger vessels were conveyed down to the river to the sea.

Lumber and Skilled Labor

Aside from the fact that the river was hard to navigate the location was ideal because of the forests of oak, beech, maple and pine nearby. Skilled labor was abundant and cheap. Wages were from two to six shillings per day, and a day meant from daylight until dark. The men were paid off on quarter days, four times a year. All iron work was made from wrought iron converted from bog ore of which the surrounding ponds furnished an ample supply. These vessels were copper fastened with native copper smelted at the works of Governor Endicott at Salem. These works were established in 1648.

Shipbuilding was all done by hand even to the sawing of timbers. Saw pits were provided for this purpose. The broad ax the adze and the hand plane were the principal tools. All the iron work, including anchors, was hand forged. Comparatively large anchors were sometimes forged under tilt hammers.

The Master Shipbuilder

The method followed in building a ship in those days was to lay the keel and then set the stem and stern timbers in place. Next a half mold was made for the midship section and another for the transom, if the vessel was to have a transom stern. Other half molds were placed forward and aft of the midship mold. Then by means of clear grain wood battens the master shipbuilder proceeded to fair the hull by bending the battens and building in molds to suit. In other words, instead of fairing the lines on the drawing board and on the mold loft floor as is done today, the old time shipbuilder faired his lines as the actual work of shipbuilding progressed. When the hull was faired to suit the master builder, the half molds were used as patterns to shape the timbers for both sides.

After the frames were made to the molds they were set in place in the usual way, dubbed off, and the vessel planked and ceiled. It was a long process and not well adapted to the building of large ships. However, many beautiful vessels were constructed in this rule-of-thumb manner for it was not until the clipper ship days, ushered in by Griffiths with his RAINBOW in 1843, that the art of laying off a vessel began to be reduced to an exact method.

Cordage was made in nearby rope walks. Sails were made of home grown flax, spun and woven by hand, for in the early days of shipbuilding the power loom was yet to be, and as the cotton gin had not been invented, cotton was too expensive to use for sail making. Early in the nineteenth century, cotton began to replace flax for sails.

Origin of Many Fortunes

By 1835 shipbuilding on the North river was doomed. The site was unsatisfactory, the timber was vanishing and the call for larger vessels transferred the business to other yards. The palmy days of shipbuilding in this location were from 1700 to 1810 when many yards were in operation.

For over a century and half shipbuilding had brought prosperity to the surrounding towns, sons followed their fathers, and many New England fortunes had their inception in the now forgotten shipbuilding activity of other days along the North river in Plymouth county Mass.

Officers Are Elected

At a recent meeting of the board of directors of the Foster Wheeler Corp., New York, Harry S. Brown was elected president, succeeding his brother J. J. Brown, who continues actively as chairman of the board. Mr. Brown received his engineering degree at the Cornell university and joined the Power Specialty Co. in 1904.

At the same meeting, David McCulloch, formerly secretary and general manager, was elected executive vice president, and Walter F. Keenan Jr., George B. Ferrier, and J. J. Nelis were elected vice presidents. P. N. Wenz was elected secretary.

At the National Metal Congress and Exposition, to open in Chicago, Sept. 30, thirty-nine papers are to be presented dealing with problems and developments in all branches of the metal industry.

Among the papers of special interest in shipbuilding is *Arc Welding of High Carbon and Alloys Steels*, by T. N. Armstrong, Norfolk Navy Yard, Portsmouth, Va.

Duntroon, Twin Screw Vessel For Australian Service

A MAXIMUM speed of 19 knots was attained during the successful trials, early in July, of the twin screw, diesel passenger liner DUNTROON. This vessel was built by Swan, Hunter & Wigham Richardson Ltd. at the Neptune works, Newcastle-on-Tyne, for the Melbourne Steamship Co., Ltd., for passenger service between Australian ports. Principal dimnsions of the new vessel are: Length overall, 470 feet; length between perpendiculars, 450 feet; beam molded, 65 feet, 3 inches; depth molded, 36 feet.

The DUNTROON was built under special survey to Lloyd's latest rules for highest classification, "with free board" and also to the requirements of the international convention for the safety of life at sea, the British board of trade, for a foreign going passenger certificate, the Australian navigation act and the British Factory act.

Of modern appearance, she has a raking stem, a cruiser stern and a semi-balanced double plate streamlined rudder. Seven watertight transverse bulkheads divide the hull into eight watertight compartments. The double bottom is subdivided for carrying water ballast, fresh water and oil fuel.

Three Cargo Holds

With the machinery space located amidships, there are three cargo holds forward and two aft. Of the eight 'tween deck compartments, one is fitted for carrying livestock, one for fruit, with mechanical ventilation, and one for refrigerated cargo and ship's provisions, having a total insulated capacity of 16,500 cubic feet. The remaining 'tween decks are suitable for general cargo with special attention to the requirements for carrying agricultural machinery.

Three decks extend throughout the length of the ship with a lower deck forward and aft, a bridge deck amidships, and a sports deck and navigating bridge above. All of the exposed decks are sheathed with teak.

For rapid and efficient handling of cargo, there are 18 exceptionally long steel tube booms, six of which are suited for 7-ton lifts, two for 10-ton lifts and the remaining ten for 4-ton lifts. The booms are served by 18 electrically driven cargo winches of Clarke, Chapman make, suitable for high speed lifts and of the latest type.

The windlass is also electrically driven and the chain cables are 2¼ inches in diameter. Two large electrically driven warping capstans are fitted on the after deck.

Steering is by hydro-electric gear made by Brown Bros. It is located aft and comprises four hydraulic rams, two pumps and two motors. The gear is controlled by telemotor from the bridge and also by mechanical means from a handwheel on the after deck.

Life-saving appliances include eight wood lifeboats, 30 feet long, fitted with Fleming hand propelling gear. Six of the lifeboats, on the sports deck, are carried under Taylor gravity davits, the two lifeboats in the way of the main mast are fitted with Optimum davits. In addition two lifeboats, near the forward end of the sports deck, are carried in Optimum davits, designed so that the boats may be stowed either half outboard or fully inboard.

An emergency generating set supplies power for the electrical driven submersible bilge pump and emergency lighting.

In case of fire in any of the cargo holds and in 'tween decks, a visible alarm is given in the wheelhouse, and smothering gas can be directed into the compartment affected to extinguish the fire. Fire resisting paint has been used extensively in the accommodations.

Propelling Machinery

The propelling machinery consists of two double acting, two-stroke, direct reversible, airless injection, oil engines, each developing 3600 shaft horsepower at about 118 revolutions per minute. These engines are of Harland & Wolff-Burmeister & Wain type and were built by J. G. Kincaid & Co. Ltd.

The engines each have six cylinders of 17¾ inches diameter and 47¼ inches stroke. A considerable number of vessels fitted with similar machinery are now in operation. The principal distinguishing characteristic of this engine is the arrangement of pistons in the top and bottom covers of each cylinder to control the exhaust ports in the covers. Scavenging air is introduced through ports near the middle of the cylinder and passes straight through the cylinder, thus insuring complete and efficient scavenging. The scavenging air is supplied by two rotary blowers attached to the back of each engine and driven by a chain from the auxiliary crankshaft.

The camshaft for the fuel pumps is driven by a chain from the main crankshaft. There are two fuel valves, a starting valve and a safety valve in each cylinder head, both top and bottom. Oil is used for cooling the pistons and fresh water for cooling the cylinders.

All of the auxiliary machinery is electrically driven. Power is supplied by four generating sets, each consisting of an 8-cylinder oil engine driving a 228 kilowatts, 220-volt, direct current generator at 600 revolutions per minute. An emergency air compressor and generator is driven by an oil engine running at 1200 revolutions per minute. Two auxiliary air compressors are provided each able to deliver 125 cubic feet of free air per minute. Three centrifugal separators of Vicken type are installed.

An auxiliary boiler of composite type is installed. There are three furnaces, the two wings being arranged to utilize the exhaust gases from the main engines at sea. These furnaces can also be converted to burn oil. The center furnace is arranged for burning oil only and is operated under forced draft. The working steam pressure is 75 pounds per square inch.

Ventilation of the engine room, which has been given special attention, is supplied by five motor driven fans. The system has been arranged to give maximum distribution of fresh air.

Overhauling of the main and auxiliary engines can be easily and quickly done for both engines at the same time. An extensive workshop will make it possible to maintain the machinery at maximum efficiency. A noticeable feature on this ship is the absence of vibration in any locality at all speeds.

Passenger Accommodations

Excellent accommodations, attractive in decoration and comfortable in arrangement, are provided for 266 first class passengers and 107 second class pasengers. Accommodations for first class passengers include one special suite with bedroom, sitting room and bathroom, three 2-berth deluxe rooms, each with private bathroom and one single deluxe room with private bathroom, all located on the bridge deck.

The deluxe suite sitting room is paneled in walnut and is furnished with settee, armchairs, writing table and occasional table. The bedroom is paneled in figured birch. The bathroom has tiled walls and floor.

First class staterooms, generally for one and two persons, are large, well funished, and are fitted with cot beds, wardrobe and wash basins with hot and cold water. The floors are covered with linoleum. Ample baths, shower rooms and lavatories have been provided.

Large clear space is provided on

(*Continued on Page* 40)

Equipment Used Afloat and Ashore

Temperature Control—Clutch—Chain Falls—Portable Tool—Overhead Crane—Cutting Machine—Self Aligning Coupling

FOR control of temperature in water-cooled internal combustion engines, a new device has been developed by the Edison Electrical Control division, Thomas A. Edison Inc., West Orange, N. J. By its use fully automatic protection from excessive temperaures is now possible.

The nucleus of the new device is the Edison seal temperature control. This control is completely sealed in a glass tube from which all air has been evacuated and replaced by an inert gas. The contact points cannot oxidize or become pitted by continuous operation. Neither is loss of calibration due to operation or tampering by an inexperienced person, possible.

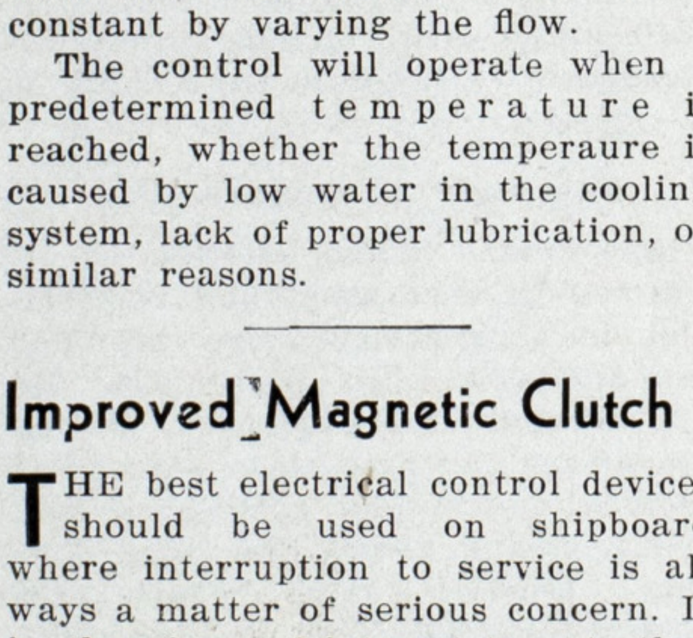
The temperature control for engines consists of this sealed glass tube mounted in a metal tube provided with standard pipe thread and suitable junction box for electrical connections.

It may be used in several ways when mounted in the cooling water of a diesel engine as folows: 1. To signal an attendant at a predetermined temperature. 2. To stop the engine when the temperature approaches the danger point. 3. To hold the temperature of the water constant by varying the flow.

The control will operate when a predetermined temperature is reached, whether the temperaure is caused by low water in the cooling system, lack of proper lubrication, or similar reasons.

Improved Magnetic Clutch

THE best electrical control devices should be used on shipboard where interruption to service is always a matter of serious concern. It is, therefore, of interest to note that a new general purpose magnetic clutch with a number of important improvements has been developed by Cutler-Hammer Inc., Milwaukee.



Magnetic clutch of improved type

An outstanding feature of this new clutch, shown in the accompanying illustration, is the method of adjusting the friction faces to compensate for wear and to assure uniform lining engagement. The inner circumference of the field ring is threaded and the adjustment is made by rotating the field ring, in respect to the magnet field member, and consequently moving it toward the friction surface on the armature member. When the field ring has been moved forward sufficiently to compensate for the wear, it is locked firmly in position.

A floating magnet armature is used in the design of the new clutch, making it impossible to score the magnet pole faces even if proper adjustment on the lining is not maintained Other features include a magnet coil which may be readily removed and replaced as a unit, rugged bronze collector rings, a lining wear indicator, and a pilot bearing to insure concentric engagement.

For Lifting and Pulling

DESIGNED for use either in the horizontal or vertical position, a new load handling device was recently developed by Yale & Towne

Chain falls operate for pull or lift

Mfg. Co., Philadelphia. Horizontally, it may be used to pull machines into position, moving materials, etc. Vertically, it is a hoist which lifts all types of loads up to the capacity of the particular unit.

The unit is compact and portable. Moving parts are completely enclosed so that they may be operated in grease and protected from injury.

New Marine Coating

A CLEAR marine coating for finishing exterior and interior natural woodwork has been developed by the Stanley Chemical Co., East Berlin, Conn. Initially the new marine coating is of unusual clarity and lightness of color. It has the free flowing qualities of a varnish and quick drying characteristics. This allows rapid application of the multiple coats essential to a good marine finish. Finishing jobs can be scheduled at two coats per day.

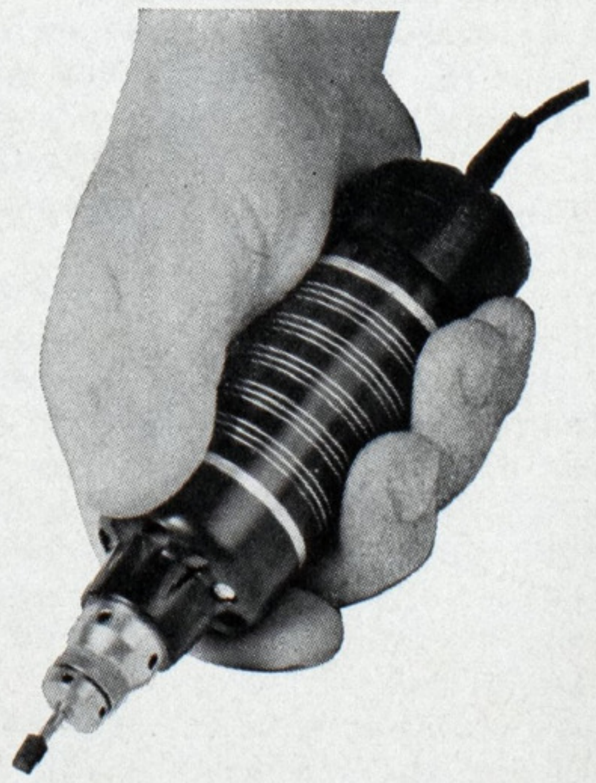
Sustained tests, where the finish was alternately submerged at high tide and exposed at low tide, as well as exposure to varying climatic conditions, all indicate a marked durability, resistance to the elements, resistance to color darkening under sun exposure, to checking chipping, or any other forms of erosion, even after a period of eight months. No evidence has been found of water spotting, waterlogging or mildewing,

Handy Portable Tool

THE portable electric tool, shown in the accompanying illustration, has recently been developed by the Chicago Wheel & Mfg. Co., 1101 West Monroe street, Chicago. Weighing not more than 12 ounces, this tool can be held in the hand or gripped like a pencil for grinding, drilling, polishing, cutting, carving, sawing and engraving.

The tool speed is 25,000 revolutions per minute and there is ample power to drive a variety of implements. It is 6 inches long overall and 1⅝ inches in diameter. The housing of aluminated duraluminum is streamlined. The electric motor, built into the tool and said to be the most powerful for its weight now on the market, is so thoroughly ventilated that it does not heat up.

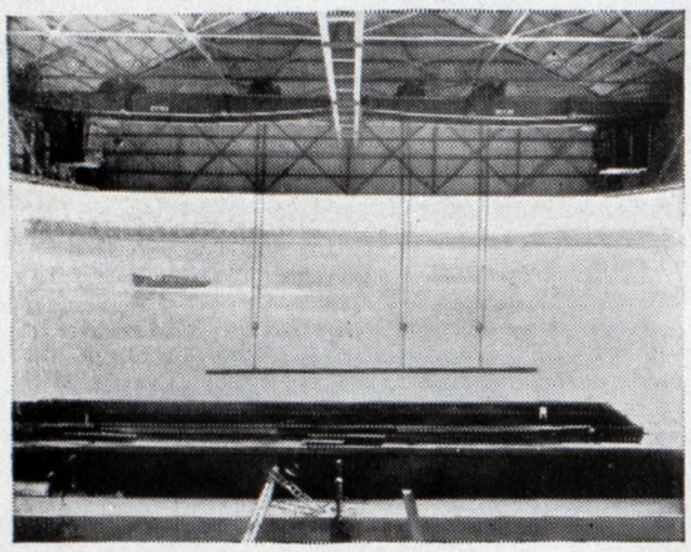
This tool operated from any 110-volt, alternating or direct current, 25 to 60 cycles.



High speed portable electric tool

Use Overhead Cranes at Barge Terminal

AN ENTIRELY new application for overhead cranes has recently been devised for the Mead-Johnson barge terminal at Evansville, Ind. To facilitate loading and unloading, a steel cantilever roof has been built to extend over the barges at the wharf. This structure provides parallel runways for two electric cranes, used for unloading materials in covered storage space and reloading on trucks and cars. The absence of center columns, as shown in the accompanying illustration, makes it possible for the two cranes to operate in tandem, using three or four hooks where extremely long pieces must be handled. These cranes, built by the Harnischfeger Corp. Milwaukee, each have a span of over 58 feet, a vertical lift of 75 feet and a capacity of 10 tons.



Overhead cranes at the Mead-Johnson barge terminal, Evansville, Ind.

Due to the low costs of water transportation in the Central and Southern states, barge traffic has been increasing on the navigable rivers, presenting a real problem in economical docking and warehousing. The faster loading and unloading at the Mead-Johnson terminal has not only speeded up barge traffic but reduced docking charges as well.

Fluid Power Described

IN PREPARING a new catalog describing its Hele-Shaw pumps, motors and transmissions, the American Engineering Co., Philadelphia, has originated the term "fluid power" to differentiate the Hele-Shaw pump from a great variety of pumps generally, with which it has little in common.

This pump belongs to a special class, designed to furnish high pressure energy which can be translated into variable, reversible linear motion through a ram or variable, reversible rotary motion through a hydraulic motor.

As fluid power, hydraulic power is more easily understandable—especially when, as in this catalog, its resemblance to electric power is carefully drawn. It is clear that fluid power can be used to advantage in many applications where a flexible and controllable source of energy is needed.

The operation of the Hele-Shaw pumps has been reduced to simple diagrams and description in order to record clearly the behavior of a pump of this type on suction and discharge strokes and the effect produced by "stroking." A special marine section in this catalog is devoted to the use of fluid power for shipboard auxiliaries.

Steel Equipment Mfg. Co., Jenkins Arcade building, Pittsburgh, Pa., has been appointed distributor in the Pittsburgh area for the Ashton Valve Co., Boston.

The Shipowners association of the Pacific coast will hold its annual convention in San Francisco, Sept. 26.

Self Aligning Coupling

A SELF-ALIGNING coupling for use in direct connected drives has been developed by the Alloy Products Corp., Waukesha, Wis. It is self adjusting so as to compensate for parallel as well as angular misalignment.

In tests the new couplings have operated satisfactorily with parallel misalignment of as much as 5/16-inch and with angular misalignment of 3 to 6 degrees. They may be used at any speed. A typical example of many applications is on a 10-horsepower motor drive operating at 5600 revolutions per minute.

The new coupling plays the part of a safety valve between the motor and drive bearings and its use is said to eliminate the necessity for shimming in order to obtain and maintain accurate alignments. It operates noiselessly and is said to reduce power losses.

The new coupling, as shown in the illustration, is made in four parts. Two of them are driving hubs into whose faces round lugs are set, two in each hub. When assembled, the lugs fit in recesses in the periphery of the third part, a drive disk made of bone fiber. These recesses are made long so as to permit the lugs to slide in them.

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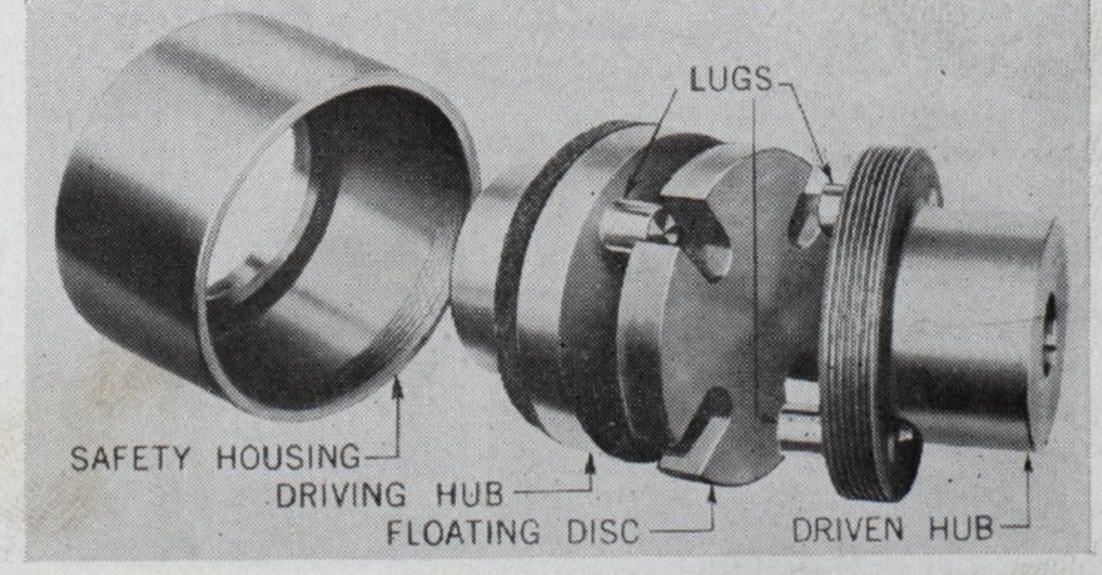

Use of this coupling is said to eliminate necessity for shimming in obtaining and maintaining alignment. It adjusts itself both to parallel and angular misalignment

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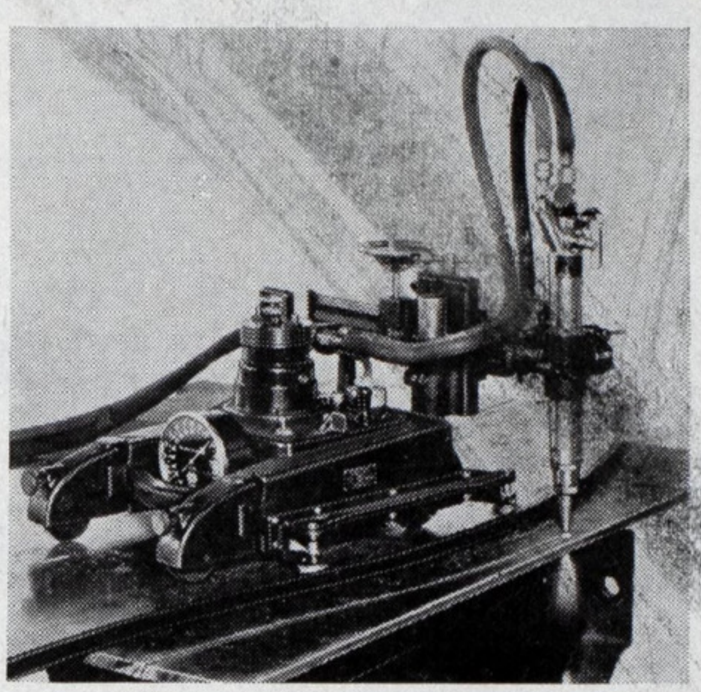
Cutting Irregular Shapes on Oxy-Acetylene Machine

A SIDE roller attachment for its No. 4 radiagraph, a portable, motor driven, oxy-acetylene cutting machine was recently perfected by the Air Reduction Sales Co., 60 East Forty-second street, New York.

By means of this attachment and a templet shaped to guide the machine and torch over a desired outline, as shown in the accompanying illustration, the radiagraph is adapted for reasonably accurate cutting of irregular shapes, involving long, sweeping curves either simple or compound.

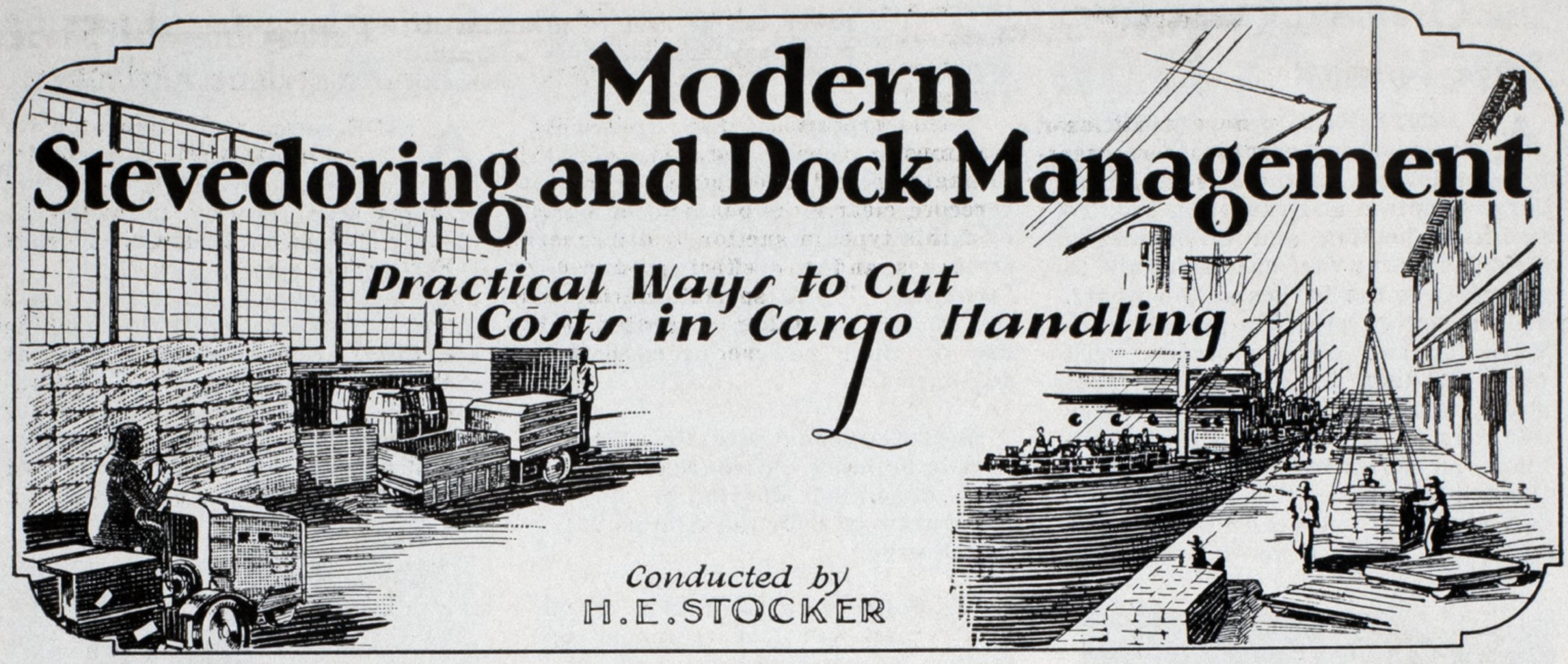


By means of new side roller attachment this portable radiagraph is adapted for cutting irregular shapes with reasonable accuracy

The side roller attachment is an assembled unit, made either right or left hand, and is attached to the side of the radiagraph by means of machine screws.

The design of the attachment places one of the rollers at a greater distance from the body of the radiagraph than the other so that when both rollers are in contact with the templet the machine faces slightly in. As a result, the machine, as it travels along, is continually tending to move in toward the templet, exerting a pressure which forces it to follow the templet either in a straight line or around a curve.

Left hand and right hand attachments make possible the construction of a templet which permits the use of two machines simultaneously.



Direct Transfer of Overseas Cargo Reduces Cost of Operation

By H. E. Stocker

THE Dollar Line operation at Jersey City, N. J., is one of the most active of the offshore operations in New York harbor. Twelve thousand to fifteen thousand tons of cargo are handled weekly. On many days over 300 vehicles have been handled on the pier.

Pier 9 of the Erie railroad is used. This pier has direct rail connections with the Erie, so that the rehandling necessary, when freight is lightered to and from railroad terminals, is avoided. The pier is advantageously located with respect to vehicular traffic, as it is over the Holland tunnel and the entrance to the tunnel is only a short distance from the pier.

The pier is double decked with railroad tracks down the center of the lower deck. Street vehicles reach the upper deck by means of a ramp. On both decks, the sides of the pier are fitted with a continuous set of doors. This is a feature of special advantage in working cargo economically and speedily. On both the upper deck and the lower deck there are driveways down the center of each side of the pier.

On the lower deck, portable platforms are rigged to add to the width of the apron. These platforms extend out over the water for several feet. On the sides of these extension platforms, there is a wooden fence, about four or five feet high. These fences are provided to keep freight from falling off the platform into the save-all nets.

On the upper deck of the pier there are short extensions built into the superstructure in many of the hatches. These extensions create aprons about six feet in width. This arrangement greatly facilitates landing the slingloads of cargo.

An Active Schedule

The schedule of the Dollar Line ships is an unusually active one. The 502-foot type steamers arrive and sail on alternate weeks. The 535-foot type steamers arrive and sail every week so that every other week both type ships are working and together make a very busy terminal.

All of the ships are fully equipped with complete cargo handling gear. They have plenty of fast working winches and plenty of booms at each hatch. For example the author saw the PRESIDENT ADAMS working. This ship has four winches and four booms each at hatches, 2, 3, 4 and 5, making a total of 16 winches and 16 booms to handle cargo quickly and economically into or out of the holds.

Full use is made of the burton method of handling cargo, using the ship's boom and the cargo mast on the pier. A block and tackle, with a line from a drum hoist on the pier to the hook is attached to the cargo mast on the pier superstructure. A ship's boom and hoist also operate another line to the same hook, and the ship's tackle and the pier tackle work together.

The following advantages of this method were immediately apparent:

1. Very effective when working

Entrance to Dollar Line pier, Jersey City, N. J. Note vehicle ramp leading to upper deck of pier

ships with short booms. Some of the Dollar line ships have short booms mounted on kingposts, two to a hatch.

2. Two gangs can be used at each hatch where but two booms are available.

3. Defective ship's winches are less of a problem because only one winch on the ship need be used in conjunction with the cargo mast and winch on the pier.

4. When two booms are available at each hatch, they can both be placed over the cargo opening and, used in conjunction with the cargo masts and pier winches, both can be used to handle cargo.

5. Drafts can be swung through the doors of the pier shed with comparative ease, thus facilitating handling on piers where there is a narrow apron or no apron at all.

6. The cargo mast is used also without a pier winch. The line from the hook to the cargo mast is brought over to the offshore winch. One short boom is used.

Tractors and Trailers

Cargo handling equipment on the pier consists of 25 gasoline engine driven tractors of various makes, 50 steel decked trailers, one gasoline crane truck, 2 hand lift trucks for skidded paper and a large variety of slings and other gear for handling a wide variety of cargo.

The tractors are all of the three wheel type. Gasoline consumption runs about 5 to 6 gallons an hour, depending on the work being performed. The crane has a 30-foot boom. Twelve-foot gravity roller conveyors are provided for use in the ship in moving cases between point of stowage and the square of the hatch.

A well equipped gear shop is maintained at the outer end of the upper deck.

Pig tin is handled in rectangular box slings fitted with sheet iron bottoms to protect the board from wear. This sling will handle a load of two to three tons at a time. The slingload is loaded on a trailer and towed to point of rest on the dock where the pigs are removed.

One is impressed by the large amount of commodities packed in fibreboard cases, which is to be expected since large quantities of Pacific coast canned goods are handled as well as many other varieties of commodities. Large quantities of cased goods are handled on platform slings. These platform slings have been designed to handle all types of case goods without damage. Claims filed for damage are few. It is interesting to know that there is no crib on the Dollar line terminal for special cargo. A space on the dock is assigned for such cargo, but it is not surrounded by a fence.

The platform slings are approximately 4 feet by 6 feet in size and are constructed of four boards laid lengthwise and four crosswise, with spaces between the boards to reduce the weight of the sling, a recognition of the principle that economy is obtained by reducing the ratio of deadweight to the live load.

The platform slings are fitted with a bridle on each side. The rings for the bridles are spaced about one foot from the center, along the side. The bridles are of wire rope and meet in an inverted "V" on top of the draft. A ring is used to attach each bridle to the hook.

On the ends of the sling, there is a net made of rope which comes up and over the ends of the cargo and effectively keeps packages from falling off the sling. This type of sling is most effective for the handling of small package cargo.

Large quantities of rubber are handled at the Dollar line pier. There are a large number of marks in a cargo which must be separated as the packages are discharged. The bales of rubber are handled in net slings when the haul from the loading point on the pier to the point of storage is short. The bales are hand trucked to their proper pile.

When the haul is long, the rubber is handled on platform slings which are landed on trailers and are hauled by tractors to a designated point where the bales are handled to proper pile.

Seventy per cent of the rubber moves from the pier by rail and the balance by truck.

Freight Tiered High

All freight on the pier is tiered very high, the greatest pile being from 16 to 20 feet high. All freight must be tiered as high as possible because, although the pier is large, space is at a premium due to the large quantity of cargo handled.

An ample supply of dunnage boards is kept on the pier ready for immediate use. These boards are one foot wide. While this width of board is more expensive than the narrower board, it protects the cargo more effectively. The narrow boards have a tendency to damage cartons more easily than the wide ones.

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General view, south side of Dollar Line pier, Jersey City. The S. S. President Taft working cargo

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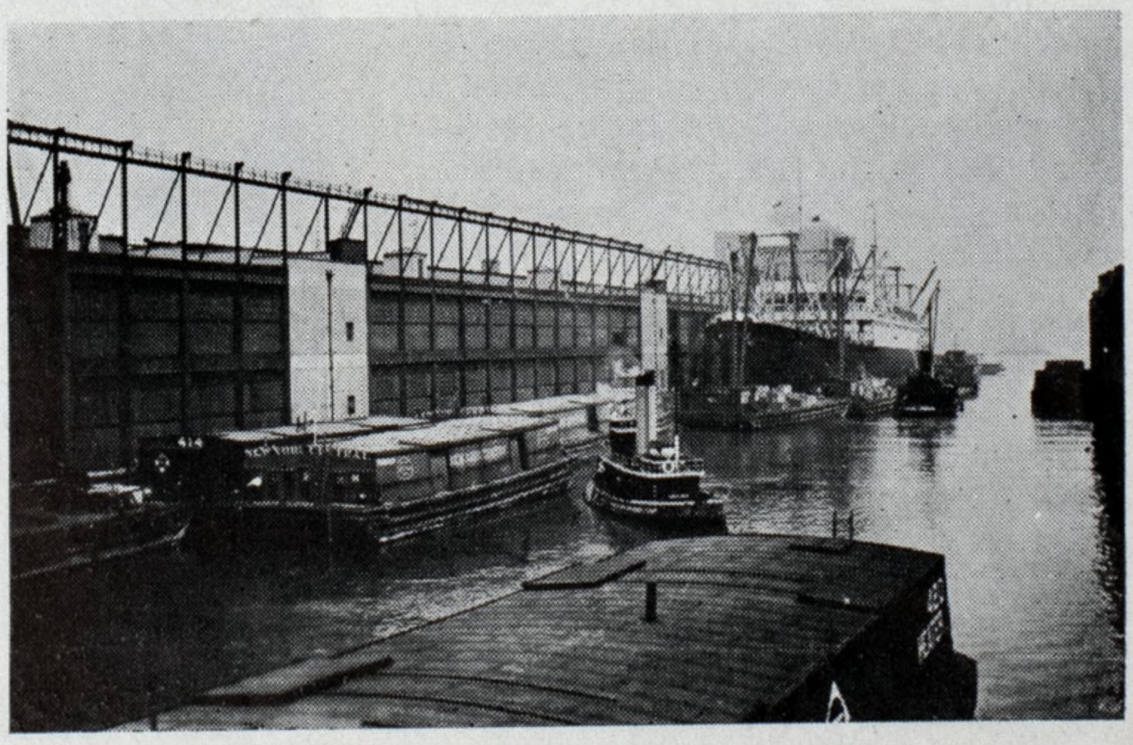


One Hundred Round Trips In Transatlantic Run

The North German Lloyd express liner EUROPA in arriving at New York, Aug. 1, completed the first half of her one hundredth transatlantic round trip. Since she entered service, on March 19, 1930, she has traveled 750,000 miles at sea and has carried a total of 215,000 passengers. She is now in command of Capt. Oskar Scharf. She sailed from New York shortly after midnight Aug. 2.

In the five years since her first appearance in New York harbor on March 25, 1930, the EUROPA has maintained a clock-like schedule for consistency in speed, promptness of arrivals, smooth and swift disembarkations, quick turnaround in port and completely dependable service under all conditions of sea and weather.

When she sailed from Bremen on her maiden voyage, March 19, 1930, she set a new transatlantic record despite contrary winds and heavy seas, arriving in New York after a passage of 4 days, 17 hours, and 6 minutes. Since then the EUROPA has several times bettered her record which now stands at 4 days, 16 hours, and 48 minutes with an average speed of 27.92 knots.

Incidentally, when her sistership, the BREMEN, sailed from New York shortly after midnight, July 26, she had a passenger list of 1250 which is a notable carrying eastward for this time of the year.

Department is Moved

The air conditioning department of the Westinghouse Electric & Mfg. Co., has been transferred from East Pittsburgh, Pa., to Mansfield, O., where it becomes a part of the merchandising division. The transfer affects all sales, engineering and manufacturing activities of the air conditioning department.

In announcing the transfer, A. E. Allen, vice president in charge of merchandising operations, announced that the company's air conditioning program will be enlarged.

Breakage of Coal Prevented, Loading Speed Increased

BY A. F. CASE*

IN RECENT years many of the larger coal companies have invested millions of dollars in plants for the classification or preparation of coal to meet a constantly increasing demand for clean, sized coal for domestic consumption. This coal leaves the plant in good condition but in the course of transit it is subject to severe degradation. An important contributing factor in this degradation is the transfer of the coal from cars to vessels by means of car dumpers.

Several Control Devices Tried

The design of these machines, in the past, has been influenced by the demand for high capacities, with only secondary regard for the elimination of breakage. Some devices have been installed to control the movement of the coal from the pans to the ships' holds, such as cut-off gates on the chutes and retarders in the pans. These have been effective, to a certain degree, in regulating the coal flow after it has entered the pan.

Most of the degradation, however, occurs before the coal reaches the point where it can be controlled by these devices. Degradation occurs, principally, in the avalanche of coal from the car to the pan, when the cradle and car are inverted. The coal in this operation rolls out of the car at terrific speed which is only stopped by its contact with the coal in the pan or by the pan retarder as the case may be. In any case, serious degradation results.

Records indicate that the amount of degradation from all operations between the classification plants and final destination is between 25 per cent in splint type coal to 60 per cent in smokeless coal. Considering the value of these coals this represents an enormous loss, varying from 50 cents to $1.35 per ton.

It is now possible to largely eliminate these losses by the use of devices designed to prevent the degradation resulting from the ordinary car dumper operation.

In 1934 the Wellman Engineering Co., Cleveland, developed a device, known as a coal hood, for installation on car dumpers to prevent degradation. The first installation was made by the New York Central railway on the car dumper on its dock at Ashtabula, O. This dock is operated by the Pittsburgh Coal Co., the largest shipper of prepared coal. The new installation was an immediate success.

This new device, which is shown in operation in the accompanying illustrations, consists of an automatically operated hood which retains the coal in the car until the cradle is turned to an angle of about 100 degrees. It is so arranged that at this point gates open allowing the coal to flow from the car, through an aperture along its dumping edge, to the pan of the car dumper under complete control and without drop. In this way the avalanche of the coal, present in all operations of unrestricted dumping, is completely prevented and consequently the usual breakage in this operation is eliminated.

The gates may be regulated and the opening adjusted to correspond to the required speed of delivery depending upon local conditions. This adjustment once made may be fixed so that all further operations will be uniform. On the other hand if the particular coal being loaded does not require careful handling, the hood may be locked out, and will not further engage the coal while maintained in this position.

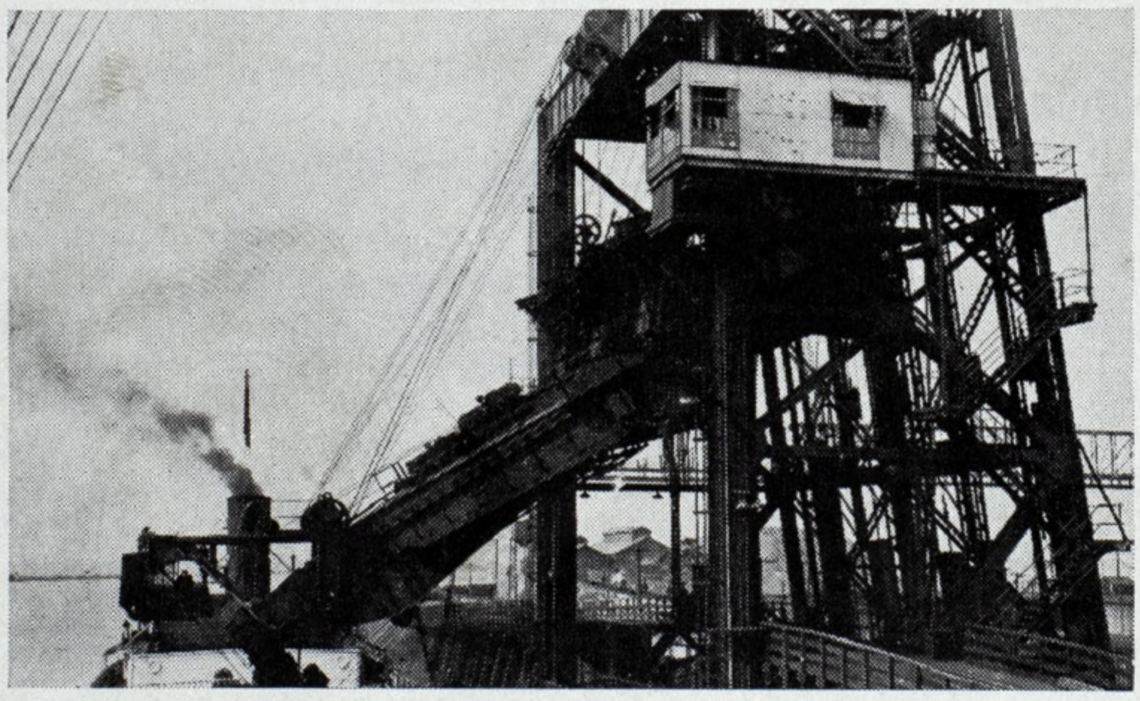
Operation Is Automatic

All operations of the hood are automatic and require no attention whatever from the operator. The hood parts are counterbalanced so that the cradle balance is very slightly disturbed. This feature makes its installation possible on existing types of dumpers where recent demands for coal conservation have made such facilities imperative.

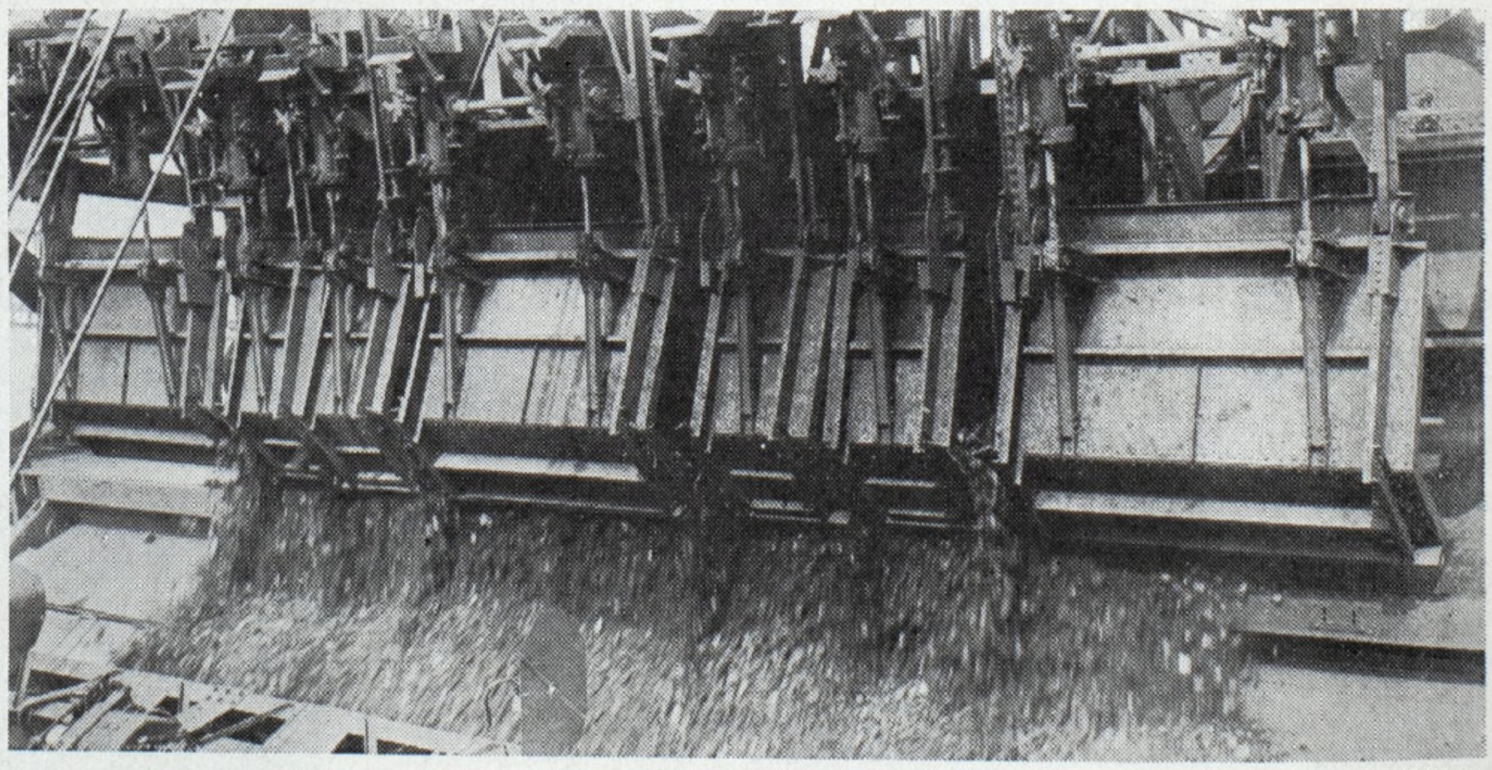
The installation on the New York Central car dumper at Ashtabula has been in constant and satisfactory operation. After a thorough investigation, the Norfolk & Western Railway Co. recently contracted for a similar installation on the new car dumper to be erected at its terminal, at Lambert's Point, Va.

Since the first use of this equipment at Ashtabula, a decided improvement has been noted in the condition of coal cargoes arriving at destination. According to various opinions the saving in the amount of slack

(*Continued on Page* 37)



Car dumper delivering coal to lake steamer at the New York Central dock, Ashtabula, O.



Automatically operated hood designed by Wellman Engineering Co., for controlling flow of coal from car dumper to prevent degradation. In use at Ashtabula

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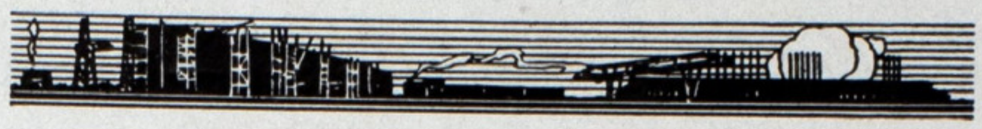
The author, A. F. Case, is manager of the Ore and Coal Division, The Wellman Engineering Co., Cleveland.

Useful Hints on Cargo Handling



THE new pier of the Norfolk & Western railway at Hampton Roads, Va., according to estimates, will cost approximately $1,600,000. With the new equipment the railroad can handle coal from the mine to the vessel without a transfer of the product and with practically no breakage. The pier will be 1000 feet long and will accommodate the largest vessel now taking coal on the Atlantic coast. The equipment, which will be located just north of Norfolk & Western pier No. 4, is so designed as to work automatically in many respects and will have a dumping capacity of 50 cars of coal per hour.

Retarding devices on the coal car dumper, illustrated and described on the opposite page, will control the flow of coal, which, together with the telescopic chute, will provide speedy operation and eliminate breakage of prepared sizes of coal.

The end of the telescopic chute will be equipped with an independent-acting, double, under-cut gate which can place the coal in any part of the hatch desired.

The gravity yards and scales at Lambert point which serve the Norfolk & Western piers also will serve the new pier. Car retarders will be used on both the approach track to the coal dumper and the empty return track to the yard. The dumper will be equipped with the latest type electric machinery and the mechanical "mule" haulage system. It also will be equipped with a sprinkler system for sprinkling coal when required.

The slip next to the car dumper is being dredged to a depth of 38 feet. The fender system of the pier will be creosoted piles and timber, while the trestle supporting the tracks—both on the pier and on land—will be of steel construction. The project will require approximately 450,000 cubic yards of dredging, 4500 piles in foundation and fender system, 14,000 yards of concrete, and 2200 tons of structural steel.

Loading Scrap Quickly

CRAWLER cranes fitted with electro-magnets are used at the Mystic Docks, Boston harbor, for loading scrap iron and steel from gondola cars into ships.

The first load is lowered into the hatch to prevent damage to the deck or tank tops. After a bed of scrap is placed, the metal is dropped from the magnet when it is over the hatch.

In unloading scrap, consisting of old automobile parts piled in car promiscuously without any packing, the tonnage handled per crane, with 65-inch magnet, has averaged approximately 330 tons per 8-hour day, or 42 tons an hour. This scrap is classified as the lowest type.

In handling better class scrap, consisting of castings or stove plate, an average of 425 tons has been unloaded from car into ship, per crane, in an 8-hour day, equivalent to about 54 tons an hour. This kind of scrap is ideal for handling with a magnet.

In April, in loading steel turnings into hatches of S. S. Stanja enroute for Holland, one K-44 crane unloaded 8 cars of scrap in a day, establishing a scrap re-loading record of 464 tons in 8 hours, for the port of Boston.

THIS page is being devoted to short items on all matters having to do with the more efficient turnaround of ships. These items are intended to be of a helpful nature.

We will welcome for this page brief descriptions, illustrated if possible, of any better or safer way of performing any function in cargo handling. Also, any questions submitted will be answered by the editor.

Use Conveyors for Baggage

AT THE French Line pier, New York, there are twelve portable conveyors, ranging from 30 inches to 42 inches wide, by 28 feet to 53 feet long, measured from center to center of head and foot shafts. Two of these conveyors are of the rubber belt type; the other ten conveyors, handling the trunks or heavier baggage, employ a carrying apron or continuous platform made of wooden planks secured to a strand of malleable iron roller chain at each side of conveyor.

The belt conveyors are used for handling hand baggage and bags of mail. Each conveyor is driven by a separate electric motor, and has capacity to take away the baggage as fast as attendants can do the loading.

Nine of the conveyors are connected in groups of three, by means of adjustable steel plates so that trunks will slide from one conveyor to the other. These adjustable plates compensate for tidal movement, and for listing of the ship.

All conveyors operating on an incline are equipped with double winch heads at the one end. These winches are used for raising and lowering the conveyors into working position, and moving them toward the ship. The winch heads are operated from conveyor countershafts, the design being such that the conveying medium cannot be operated while the winches are being used. All conveyors are reversible in direction of operation.

More cargo can be obtained by a wide awake freight solicitor who learns how his company handles freight and brings the good points to the attention of the shipper—and who works with the operating department of his company to correct the conditions which cause damage to packages.

Keep Equipment Shipshape

AT KAHULUI, T. H., all equipment, lift trucks, trailers, platform slings, conveyor chutes, etc., are painted yellow and black and are kept well painted at all times. The superintendent of the terminal says that the money which he spends on paint is more than offset by the resulting care which the longshoremen give to the equipment. Each gang is given certain equipment for working a hatch and the work is compared.

This is another example of the application of the methods of modern industrial management to cargo handling.

Careful stacking of cases on a terminal is necessary to prevent damage. If dunnage is laid it should be so laid that the edges do not cut into cases. Too often the edge of a case or carton overlaps the edge of a case or carton in an adjoining pile, giving an excessive concentration of weight on that edge, causing damage.

A New York stevedore selected three wheel type tractors because of superior maneuvering ability on a congested terminal.

Split falls are fastest for handling cargo in deep trunked hatches.

Up and Down the Great Lakes

Traffic at the Soo — Vessels in Service — Freight at Chicago — Coal and Ore Shipments — Lake Levels — Drainage Canal

MOVEMENT of freight in July through the United States canal Sault Ste. Marie, Mich., amounted to 7,219,592 short tons, while 283,341 tons moved through the Canadian canal, making a total of 7,502,933 tons.

The eastbound freight totaled 5,641,898 tons through the United States canal and 198,497 tons through the Canadian canal, while 1,577,694 tons moved westbound through the United States canal and 84,844 tons through the Canadian canal. The number of vessel passages through the United States canal was 1577 with a net registered tonnage of 5,986,485, and 478 vessels of 445,108 net tons passed through the Canadian waterway. The total number of passengers carried through both canals amounted to 4770 passengers eastbound and 5004 westbound.

Wheat in the amount of 26,224,144 bushels moved eastbound, while other grains totaled 1,407,686 bushels. Iron ore shipments amounted to 4,836,613 short tons. Coal made up the bulk of the westbound movement, soft coal totaling 1,345,967 short tons and hard coal, 42,765 short tons. Oil totaled 71,542 short tons, stone 90,296 short tons and general merchandise, 80,464 short tons.

Receivership Lifted

The Minnesota Atlantic Transit Co., Detroit, has completed reorganization, its property and assets have been returned and it is again doing business on its own account without change in corporate existence or capital structure. This has been accomplished without the introduction of new capital, due to the success of operations during the receivership.

The officers are: President, H. Townsend Hoopes, Detroit; vice president, John L. Losie, Minneapolis; treasurer, J. J. Lyon, Buffalo; secretary, Ansley W. Sawyer, Buffalo; and assistant secretary, W. A. Young, Detroit.

Lighthouse at Conneaut

Work on the new lighthouse being built at Conneaut, O., is nearing completion. The new lighthouse towers 85 feet above lake level, and marks the northern terminus of a new million dollar breakwall extension. The structural steel work has already been completed, while the work of connecting the modern, automatic light and fog signal with the shore control room, 7000 feet away, will not be commenced for a month.

The installation of the control cable will also be deferred until the last small section of the west breakwall, where about 5000 tons of stone have yet to be lowered into place, is completed.

July Lake Levels

The United States Lake Survey reports the following monthly mean stages of the Great Lakes for the month of July, 1935, determined from daily readings of staff gages.

Lakes	Feet above mean sea level
Superior	602.98
Michigan-Huron	578,61
St. Clair	573.93
Erie	570.86
Ontario	244.32

Lake Superior was 0.27 foot higher than in June and it was 0.14 foot above the July stage of a year ago, 0.58 foot above the average stage of July of the last ten years.

Lakes Michigan-Huron were 0.20 foot higher than in June; and they were 0.53 foot above the July stage of a year ago, 0.91 foot below the average stage of July of the last ten years, 3.74 feet below the high stage of July, 1929.

Lake Erie was 0.10 foot higher than in June and it was 0.46 foot above the July stage of a year ago, 1.18 feet below the average stage of July of the last ten years, 3.29 feet below the high stage of July, 1929.

Lake Ontario was 0.18 foot higher than in June and it was 0.34 foot above the July stage of a year ago, 1.69 feet below the average stage of July of the last ten years.

Commander Kent Retires

Lieut. Commander Melvin C. Kent, U.S.N., will retire, upon his own application, on Sept. 1, after completing 30 years of service. His career in the navy's hydrographic service on the Great Lakes is almost unique, having been assigned to that duty for each of his last three tours of shore duty.

In the fall of 1922 Lieut. Commander Kent was placed in charge of the branch hydrographic office in Chicago. While in that post he submitted recommendations which resulted in a complete reorganization of the service on the lakes, and started it on its way to its present efficiency.

Six years later he was ordered to duty as officer in charge of the branch hydrographic office at Detroit, where he supervised the transfer of the publishing of the *Notice to Mariners* for the Great Lakes from Washington to Detroit. In 1932, he was again ordered to Detroit as division commander of the Great Lakes hydrographic service.

Lieut. Commander Kent has contributed much to the expansion and improvement of the hydrographic service to its present state of efficiency where it commands the appreciation and support of every shipping interest on the Great Lakes.

More Vessels in Service

A slight increase in the number of bulk vessels operating on the Great Lakes is shown by figures compiled by the M. A. Hanna Co., Cleveland. Out of a fleet of 324 American bulk cargo vessels on the lakes, with a total trip capacity of 2,720,300 tons, operated by 24 companies, 179 vessels of 1,600,200 tons capacity were in commission on Aug. 15. Of the total fleet available, the vessels in commission on Aug. 15 represent 53.71 per cent in number and 58.82 per cent in carrying capacity.

These figures compare favorably with those of July 15, as there were only 159 vessels (49.07 per cent) of 1,461,100 tons (53.71 per cent) trip capacity then in commission. The figures are slightly lower, however, than those of a year ago. Out of a fleet of 328 vessels of 2,748,800 tons at that time, 180 vessels of 1,628,000 tons were in commission as of Aug. 15, 1934. This represented a percentage of 54.88 in the number of vessels and 59.23 per cent in carrying capacity of the total fleet then available.

The Ashmead Danks Co., Rockefeller building, Cleveland, has been appointed to represent The Ashton Valve Co., Boston, in the northern Ohio area, distributing safety and relief valves, pressure gages, etc.

Chicago Receives Cargoes Of Grain and Lumber

Heavy shipments of foreign grains have marked the season's traffic on the Great Lakes this year. For the first time in history Chicago has received foreign grains in volume, the most unique and one of the latest shipments being 100,000 bushels of corn from South Africa. This cargo, moved thousands of miles around the Cape of Good Hope and via Montreal through the Great Lakes to Chicago, involved an import duty of $25,000 and a shipping cost estimated at $20,000.

Other receipts at Chicago this year include over 500,000 bushels of oats and 600,000 bushels of corn from Argentina. More than 800,000 bushels of foreign rye also has been received. Heavy imports result from last year's drought as well as from the government's crop curtailment program. Both have combined to reduce exports of domestic grains. Shipments from Chicago to date have been substantially below the level of the several preceding years.

Fairly extensive shipments of Pacific coast lumber have been made by water to Chicago this year, the movement making use of the Illinois waterway. Coast vessels take the cargo from the far Northwest to New Orleans where it is transferred to barges and transported up the Mississippi river and Illinois waterway. Several million feet have been shipped in this manner at a saving estimated at $4 to $6 per thousand feet. Practice has been to unload the lumber at Chicago on the Chicago drainage canal in the south branch lumber district for transfer into freight cars which are switched to various retail yards.

Capt. O. R. Barrett, president of the Barrett Line Inc., and the Barrett Lime Quarries Inc., both of Cincinnati, died at Cincinnati Aug. 12. He was also, for a number of years, prominent in the development of the Ohio Valley Improvement association.

Chicago Drainage Canal

An adverse report has been made by the United States engineers on the advisability of the purchase by the United States of the canal now owned by the Sanitary district, Chicago.

The principal grounds upon which the adverse conclusions are based are: that the United States does not need title to the canal in order to exercise control over navigation; that no additional benefits to present or prospective navigation would result from the purchase of the canal; and that purchase cannot be justified from the viewpoint of equity.

Those interested may appeal from this conclusion to the board of engineers for rivers and harbors, a permanent body, sitting at Washington, D. C., to which all examination and survey reports of this character are referred.

The A. M. Byers Co., Pittsburgh, well known as a leading manufacturer of wrought iron products, recently announced an expansion of its manufacturing activities to include the making of steel pipe. The steel pipe will be made in the company's modern pipe mills under the same executive supervision.

Coal Shipments Decrease Over Two Per Cent

Bituminous coal shipments, via lake vessels from Lake Erie ports, from the beginning of the season up to 7 a. m., Aug. 12, amounted to 18,639,433 net tons of cargo and 580,831 net tons of bunkers, a total of 19,220,264 net tons. The total tonnage so far this season is 502,325 net tons, less than the total movement for the same period in 1934. However, it is three million tons more than the movement in the same period of 1933, and almost double the movement during the same period of 1932.

Specific figures for the movement of bituminous coal in previous years are as follows: For the season of 1934 up to Aug. 12, cargo coal moved amounted to 19,115,463 net tons and bunker coal, 607,126 net tons, a total of 19,722,589 net tons. For the same period in 1933, cargo, bunkers and total bituminous coal shipments were respectively; 15,605,985 net tons, 443,129 net tons, and 16,049,114 net tons. For the same period in 1932, the figures for bituminous coal shipments in cargo, bunkers and total, were respectively; 10,206,059 net tons, 252,410 net tons anl 10,458,469 net tons.

Average shipments of bituminous coal each week for the four weeks ending 7 a. m., Aug. 12, amounted to 940,193 net tons of cargo and 35,103 net tons of bunkers, or a total average of 975,296 net tons. This is a decrease from the average weekly shipments for the four preceding weeks of 112,260 net tons.

Shipments of anthracite coal on the lakes for the season up to Aug. 1, 1935 amounted to 305,528 long tons, while for the previous year the amount was 390,039 long tons. The movement this year, however, is almost twice that of 1933 and nearly three times that of 1932, the tonnage for these years up to Aug. 1 being 171,392 long tons and 113,374 long tons respectively.

Ore Movement Continues Above Last Year

Shipments of ore from upper lake ports during July amounted to 4,460,536 tons as compared to 4,432,140 tons moved in July a year ago, an increase of 28,396 tons. A total of 12,606,029 tons of ore has been shipped during the season up to Aug. 1, 1935, as compared to 11,523,525 tons in the same period last year, an increase of 1,082,504 tons.

Ore moved by rail from Lake Erie ports to furnaces in July showed an increase of 103,062 tons over July a year ago, 2,328,068 tons being shipped as compared with 2,225,006 tons. Shipments for the season also showed an increase, 6,670,614 tons having been shipped as compared with 6,332,537 tons last year.

Receipts of ore at Lake Erie ports showed a slight decrease during the month of July, 3,295,198 tons having been received as compared to 3,362,090 tons during July last year. The total receipts of ore at these ports for the season up to Aug. 1, 1935 was 8,524,165 tons as compared to 7,947,006 tons a year ago.

(*Continued from Page* 11)

sions, $3,675,000 each.

Bethlehem Shipbuilding Corp., San Francisco Calif., Union plant—Delivery, one, 27 months; two, 27 and 30 months. One vessel, $4,940,000, and with adjustment provisions, $3,950,000. Two vessels, $4,600,000 each, and with adjustment provisions, $3,675,000 each.

Proposals were made that if these vessels were built as duplicates of the two now under construction by this company at the Fore River plant, a reduction of $55,000 would be made in the price of each destroyer, and the delivery time of each would be shortened by three months.

The Bethlehem Shipbuilding Corp., it is apparent from these bids, was the lowest bidder on one vessel of the 1500-ton type destroyer.

(*Continued from Page* 34)

ranges from 18 to 35 per cent, which represents a substantial sum on a single cargo. The aggregate saving in a season's operation will be many times the cost of the equipment.

The vessel owner also benefits by the increased speed of loading. When handling block coal, due to the restraining action of the hood, the capacity of the car dumper is increased about 25 per cent since slow operation of the cradle is not necessary. Before installation of the hood on the car dumper at Ashtabula it was customary to slow down the cradle operation when handling block coal to about 22 cars per hour. The rate of loading has now been increased to 30 cars per hour and the coal is in better condition than before.

Reviews of Late Books

Lewis' New Air Conditioning for Comfort, by Samuel R. Lewis; second edition; cloth; 277 pages and large psychrometric chart; 8½ x 5½ inches; published by Keeney Publishing Co., Chicago; supplied by MARINE REVIEW for $2.50, postpaid, and in Europe by the Penton Publishing Co. Ltd., Caxton House, London.

This new book is a complete rewritten and enlarged edition of *Air Conditioning for Comfort*, published in 1932. The terms used in air conditioning are defined and air conditioning systems and equipment are described. The psychrometric chart is explained and its use described. Formulas and methods of computation are presented. Eighteen different computations in air conditioning and design are explained and examples given.

Humidifying and dehumidifying are discussed with descriptions of methods and equipment including numerous typical examples. A chapter is devoted to refrigeration for air conditioning, including water vapor.

Interesting data are presented on air conditioning and the human body, comfort, and health. Tables are given of design temperatures for both heating and cooling, and there are ten full page plates of coefficients of heat transmission through various types of construction.

Information and tables are presented on heat from the sun and other sources and the effect of heat gain on the cooling load. Other subjects covered are: design air volumes, infiltration and ventilation, air distribution within rooms and duct design and layouts. Many tables and examples are included. This section is of great importance as the success of an air conditioning installation depends largely upon air distribution. Also fully discussed is water circulation in heating and cooling, with examples of the design of piping for air conditioning installations.

How to estimate operating costs is explained and there is a curve of operating hours for cooling plants based on design wet bulb temperature. The last four chapters are devoted to a detailed design of year round air conditioning systems for a residence and for a commercial building.

Though this book does not discuss the specific problem of air conditioning on shipboard, the basic problems are similar and it will, therefore, be found useful by marine engineers.

The author is actively engaged as a consulting engineer in air conditioning work. He is a past president of the American Society of Heating and Ventilating Engineers and is recognized as an authority on this subject.

Inventing the Ship, by S. C. Gilfillan, Ph.D.; cloth; 294 pages; 8 x 5½ inches; published by Follett Publishing Co., Chicago; supplied by MARINE REVIEW for $2.50 postpaid; and in Europe by the Penton Publishing Co. Ltd., Caxton House, London.

The story of the ship since ancient times has intrigued many. But here is a fascinating story that approaches the subject from an entirely new viewpoint. This is the tale of the ship retold in the story of the inventions that throughout the years have wrought the changes from a floating log to the huge ocean liner of today.

By graphic text and rare pictures (there are 80 illustrations), the age of ancient rowers, crude sailors, high-pooped galleons, famous American clippers, primitive sidewheelers, great screw steamers and the novel rotorship pass in reveiw.

How did these changes come about? Who made them? What were the controlling factors? In a word, how did we get our ship? What is her future? To these questions this book gives well prepared and interesting answers.

To those who are interested in ships and their history, to students of invention and to those in need of a first class reference book on the ships of all time, this book, scholarly in fact, richly illustrated, understandable to the layman, yet complete and accurate, meets all requirements.

There are pictures and descriptions of the earliest sea-going ships of the Egyptians; of the Viking ship of the eighth to the eleventh centuries; of the Norman ship of the Crusaders; of the Dutch East Indiaman, of about 1635; of the early Atlantic ocean liners; the sailing ship; and of the rotorship.

The following chapter headings give a broad outline of the contents: Evolution of the Sailing Ship; Earlier Steamship Inventions; Screw Propulsion; Brilliant Sunset of the Sailing Ship; New Rudders, Contra Propellers and the Motorship; the Rotorship and Other Novelties; History of Ship Designers and Inventors. There are also special bibliographies on histories of the ship and on primitive inventions and a catalog of 30 social principles of invention and a complete index.

The author is a former curator of ships in the Museum of Science and Industry, Chicago. He is a doctor of philosophy of Columbia university in sociology, instructor of social science, and author of numerous articles on nautical history and inventions.

The Westinghouse Electric & Mfg. Co. reports a substantial increase in business. Orders received during the first six months of this year were 21 per cent higher than during the first half of 1934; and for the second quarter were the highest since the second quarter in 1931. Sales billed during the first six months were $62,296,017 or 38 per cent higher than for the same period last year. Net profits for the six months ended June 30, 1935 were $6,265,188 as compared with a net loss of $31,725 for the same period in 1934.

Harry W. Beedle has been appointed manager of the Boston branch of the Electric Storage Battery Co., Philadelphia. Mr. Beedle has been associated with the company for 35 years, and since 1920 has acted in the capacity of assistant manager of the company's branch office in Boston.

Dr. Everett P. Partridge has been appointed director of research of Hall Laboratories Inc., Pittsburgh. He has distinguished himself during the past ten years by his researches in boiler water problems.

As director of research, of the Hall Laboratories, Dr. Partridge will continue his interest in boiler water treatment.

The Grace line will open an uptown office in the International building, of the Rockefeller center at 628 Fifth avenue. The office will be opened on Oct. 1.

The Brown Instrument Co., Philadelphia, on its seventy-fifth anniversary is announcing a new line of air operated controllers for temperature, flow, pressure and liquid level.

A. J. O'Leary has been appointed assistant to the general manager of sales at Lukens Steel Co., Coatesville, Pa. The New York offices of the company have been moved to the Chrysler building, 405 Lexington avenue.

A new illustrated 16-page booklet, *Thermit Welding—Industry's Master Maintenance Tool*, has been issued by the Metal & Thermit Corp., 120 Broadway, New York. Among the subjects covered in this book are: the actual welding used in repairing large machine parts, huge marine castings, crankshafts and similar applications.

Personal Sketches of Marine Men

Capt. George Fried, Supervising Inspector, Second District, New York

By Ben K. Price

SKILLFUL, courageous, resourceful, his remarkable record at sea places him in the first rank of American merchant seamen.

FOR persistence under difficulties, the ANTINOE rescue stands out as one of the finest episodes in the annals of the sea.

HIS selection to a post of high responsibility in the steamboat inspection service was received with universal approval.

MENTION of Capt. George Fried to succeed Dickerson N. Hoover, who recently retired as assistant director of the bureau of navigation and steamboat inspection, again brings to public notice a career honored for exploits of skillful seamanship in rescues at sea. It directs attention to a career, covering many years' experience at sea in both the navy and the merchant marine, and latterly capped with work of distinction in the steamboat inspection service.

A modest, unassuming personality, Captain Fried probably has been the recipient of more honors in recognition of his indomitable and skillful seamanship than any other American in the last decade. His reception in New York following his rescue early in 1926 of the captain and 25 members of the crew of the British freighter ANTINOE stands as one of the most enthusiastic ovations ever accorded a man in the American merchant marine. This rescue after four days of gruelling effort amid tumultuous seas brought world-wide acclaim to him and his men.

Then, scarcely three years later, as master of the AMERICA, he rescued 32 men from the Italian freighter FLORIDA. These were the highspots but there are other occasions also in which he was identified with rescues at sea.

Captain Fried was born in Worcester, Mass., Aug. 10, 1877. He received his education in the public schools of that city and spent his early life on a farm. As his first venture away from home, he joined the United States army, but was recalled by his parents because of his youth. Some time later, however, in 1900, he joined the navy.

He served five years on the U. S. S. HARTFORD, the old flagship of Admiral Farragut, and then followed service on the cruisers MINNEAPOLIS and WASHINGTON and the destroyer ROE.

In 1916, he joined the merchant marine, as third officer in the SOLACE, but was recalled to the navy shortly prior to the World war and was assigned to the U. S. S. KENTUCKY. He then spent one year in command of the ZUDERDYK with the rank of lieutenant, running supplies to Brest. In August, 1918, he was appointed navigating officer on the transport AMERICA and during the service in her he transferred 6500 troops and officers of Czechoslovakian army from Vladivostok to Trieste.

Three years later he was transferred to the merchant marine for the second time and was appointed chief officer of the AMERICA, where he remained until 1922 when he was appointed master of the PRESIDENT ROOSEVELT. In 1928, he was transferred to the AMERICA and early in 1930 was appointed master of the GEORGE WASHINGTON. He made three trips in the LEVIATHAN as master, relieving Captain Randall, and in December, 1931, again assumed command of the PRESIDENT ROOSEVELT. In July, 1932, he was relieved by Captain Jensen to stand by the MANHATTAN then under construction at Camden.

On Aug. 10, 1932, he took the MANHATTAN out on her maiden voyage and continued in command until February the following year when he was named to command her sistership the WASHINGTON. Again he stood by at Camden while the ship was being completed and took her out on her maiden voyage, May 10, 1933.

He held this post until late last fall when he was appointed supervising inspector of the second district with headquarters in New York, succeeding John L. Crone, retired. Within a few days before giving up this, his last command, he was identified with a rescue at sea. A lifeboat from the WASHINGTON picked up five men from a newsreel company's airplane which had come down on the sea in damaged condition off Cape Race. For this service Captain Fried and chief officer Ralph C. Dooley and 10 members of the crew were awarded the first distinguished service medals of the United States lines.

Medals, scrolls, honors almost innumerable have been awarded Captain Fried; tributes from foreign governments, as well from his own; yet none perhaps summed up more succinctly his record than did his own native state, Massachusetts, when it inscribed on a token—"to Captain George Fried, exemplifying in the highest degree America's traditions of the sea, skillful, courageous, resourceful."

Churchill on Hudson Bay

(*Continued from Page* 17)

reductions have been made in the excess insurance rates. At first a substantial increase above the basic Atlantic rate for insurance was levied on shipping going to Churchill, amounting to 50 shillings per cent plus 2 shillings per gross ton registered, with higher rates after Oct. 1 and still higher after Oct. 7. Three reductions have now been made, that announced in the spring of the present year being 25 per cent with a further reduction of 25 per cent for ships equipped with gyro compasses. Further reductions are being sought and expected and eventual equalization with Montreal in this regard is looked for.

Each year the port is extending not only the volume but the variety of its exports and imports. To the original shipments of wheat have been added cattle and lumber, the lumber being sawn and dressed at The Pas after being floated down the river. Western Canadian honey is also being shipped to Europe by this route. Incoming vessels bring mixed cargoes, these consisting mainly of the necessities of the immediate settlements about the port on Hudson's Bay—machine parts, paper, barbed wire, window glass, cartridges, school supplies and coal.

Its Future Possibilities

From the progress Churchill has made in the period of depression, with most of the country's primary industries at extremely low ebb, it can scarcely be doubted that port business will show a sharp rise with an upturn in the nation's economic affairs. One firm it its understood is arranging to bring in Welsh coal in quantity and another is considering the erection of stockyards. An oil company contemplates importing crude oil and establishing storage tanks at the port.

Other possibilities of Churchill which the not distant future may see realized are a fishing industry and a reindeer industry both of which will ultimately involve the erection of packing plants. Certain it is that with the return of more normal conditions and more adequate prices for minerals the section of northern Manitoba about Hudson's Bay will experience a brisk development and Churchill become an increasingly important point of traffic of this nature. The territory is still only a wilderness and Churchill will grow with its development.

How far it will develop in its commerce as a distribution point for western Canada is problematical. The briefness of the season is, of course, against it but Churchill is capable of handling economically a volume of traffic many times greater than at present and it is safe to say that every vessel which can be induced to come to the port for the products of northwestern Canada will bring capacity cargoes of the necessities of that territory. Churchill is a pet project of the western provinces and they are inclined by sentiment no less than economic consideration to give support. Steady progress may be looked for, especially as the northward trend of settlement and commerce continues and accelerates.

The proper way to regard Churchill today, in fact, is not as an individual, isolated development but as a harmonious part of that elaborate northern exploitation which has been taking place uninterruptedly and unostentatiously during a period when Canadian affairs in general would seem to have been almost at a standstill. When more normal conditions prevail and the Dominion resumes the rate of progress one has come to look for there will dawn a general consciousness of the phenomenal things which have been happening in the north, revolutionizing every phase of the territory's activities, and into this new scheme of things the creation and development of a northern port will appear to fit naturally and logically.

This is the prevailing view in Canada today. Though many are still to be found to view cynically the building of the Hudson's Bay railway and the development of the port of Churchill on Arctic waters, to characterize as waste the money still being expended from which there is no adequate return, the violent partisan feeling for and against the projects has largely vanished with the completion and operation of the railway and the port. There is a general feeling now not alone that having them they should be made use of but that they are beginning to justify the enormous expenditures which have been made and will continue to be made for some time. Canada is just beginning to realize that the era of the commercial development of the north has been brought decades nearer and that one indispensable feature of such development is the provision of an ocean port.

Duntroon Diesel Liner

(*Continued from Page* 29)

the sports deck for recreation, games and sunbathing. On the bridge deck there is a large space for dancing protected from the weather. Ample promenade space is available enclosed with large opening windows.

The public rooms include a dining saloon, lounge and smoking room, entrances and staircases at B and C decks. Various kinds of wood paneling has been used throughout for the walls. A large veranda cafe is located at the after end of the smoking room. A swimming pool is arranged on the shelter deck forward.

Port of San Diego

(*Continued from Page* 15)

land and expands at its western end into two peninsulas, about 1½ miles wide, separated by an indentation known as Spanish bight.

The city of Coronado is located directly across the bay from San Diego on the more easterly peninsula. Between the two cities the bay contracts to a width about ½ mile and it is on this narrower section that the principal terminal construction has taken place. The total area of the bay at half-tide is about 21 square miles.

Harbor Improvements Underway

Extensive shoals exist outside the bay entrance east of Point Loma as well as within the bay. Through these shoals extends the navigable channel with a width of approximately 1500 feet and a controlling depth at mean lower low water varying from 32 to 35 feet. The mean range of tides at the harbor entrance and within the bay at San Diego is 3.9 feet.

The rivers and harbors committee of the house of representatives has recommended an expenditure of $1,800,000 for dredging improvements in San Diego bay. This money has been made available and work on the new dredging projects was commenced this summer.

Earlier in the summer a hearing was held in San Diego by the United States engineers to consider further harbor projects. At this hearing the harbor department of the port presented conclusive evidence of the need of prosecuting a constructive harbor program. As a result, it is expected that additinal government appropriations will be made to carry on further improvements of the bay which are necessary for San Diego's future as a world port.

A major part of the contemplated expenditures is made necessary by the rapidly increasing naval tonnage which bases on San Diego. The steady increase in naval ships together with a gradual increase in commercial water commerce will greatly increase maritime activities.

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Marine Review

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The National Publication Covering the Business of Transportation by Water

◆ The Merchant Marine And the Navy ◆

The United States is now engaged in a large building program to bring the navy up to treaty limits. The sole objective is to be prepared to defend the right to carry on our own national development in peace.

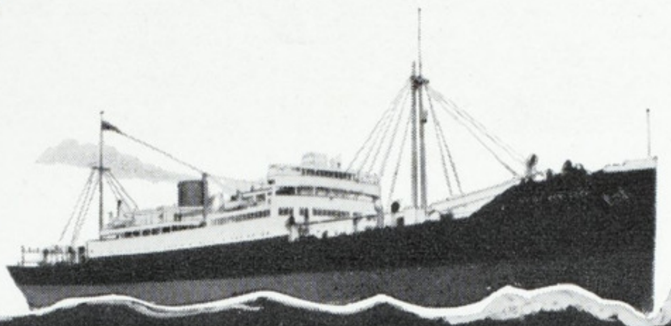
To be effective, the fighting fleet must be supported by an equally efficient and extensive merchant fleet. The last war proved that a merchant marine cannot very well be improvised during the emergency.

The navy and the merchant marine together represent the first line of defence. This defence is deficient if either is weak.

If, therefore, we are to be fully prepared, we must lose no time in creating those conditions which will make it possible for American owners to build and operate ships in the overseas trade.

September, 1935

SUN SHIPS



Passenger Ships—Cargo Ships

Oil Tankers

Diesel Engines

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Dry Docking

Engine & Machinery Repairs

SUN SHIPBUILDING & DRY DOCK CO.

CHESTER, PENNA.

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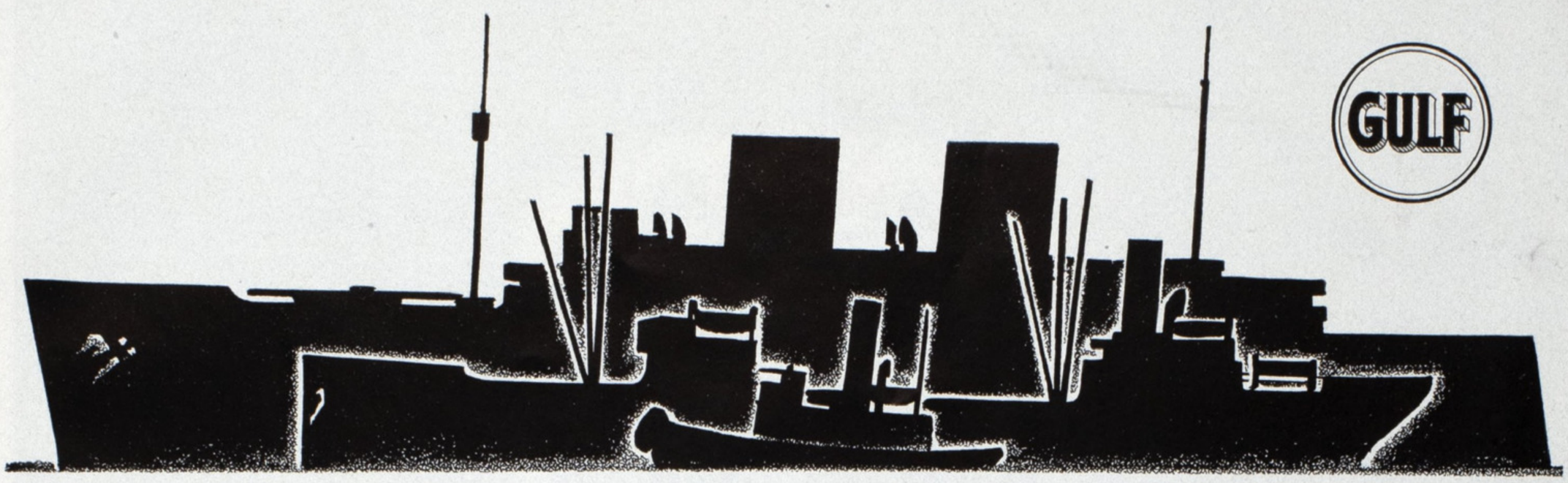

GULF

for STEAM ENGINES

GULF CRYSTAL CYLINDER OILS, made in four viscosities, highly filtered and specially compounded, insure the maximum of steam cylinder lubrication under some of the most exacting steam, temperature and operating conditions. GULF CRYSTAL CYLINDER OILS are made by a special Gulf Process and are easily atomized. This permits the steam to distribute the oil evenly over all rubbing surfaces. Their decided wetting characteristics are important in securing even and easy distribution over the rubbing surfaces. Owing to their adhesive qualities they are not readily washed from the cylinder walls. GULF CRYSTAL CYLINDER OILS have the lowest carbon residue of any cylinder oils of which we have record. Where deposits, resulting from bad water or high temperature conditions are encountered, GULF CRYSTAL CYLINDER OILS are especially recommended.

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GULFCREST OILS, made by Gulf's Alchlor Process, and manufactured in five viscosities, represent the highest quality steam turbine oils available. This famous Alchlor Process, patented and owned exclusively by Gulf, is the most thorough and effective refining process yet developed for eliminating all objectionable hydrocarbons. In addition, it synthesizes and rearranges the molecular structure of certain hydrocarbons resulting in the production of a finished oil that stands alone in its resistance to oxidation. These oils form less gum and deposits, less emulsion and sludge when mixed with water, over a period of several years' continuous operation than any other turbine oils of which we have record. Many of America's largest central stations protect their capital investment, insure uninterrupted service, and minimize shutdown and maintenance expense with GULFCREST OILS.

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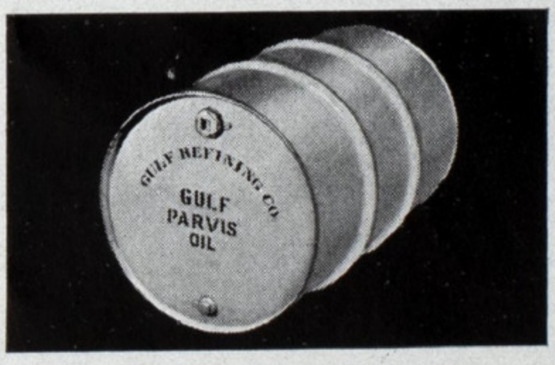
GULF PARVIS OILS, approved by more than fifty of America's leading Diesel engine manufacturers and widely used by Diesel engine operators, are the result of a special refining process to produce a stable line of Diesel engine lubricating oils that will insure minimum bearing and cylinder wear and minimum oil consumption. They are especially manufactured to remain stable and with a high resistance to oxidation from the high temperatures of combustion in Diesel engines. Improved by the finest of the new selective solvent processes, these oils have many outstanding records to their credit in operating over long continuous periods and with outstanding economy as to low oil consumption, uninterrupted service, freedom from repairs and low maintenance cost. GULF PARVIS OILS represent the maximum in lubrication to America's best known Diesel authorities and operators.



GULF offers a complete line of quality oils and greases for all types of marine equipment. Regardless of the age of your equipment or the conditions under which it operates, exactly the right type of lubricant can be selected from Gulf's complete line—the lubricant which will give you lowest operating costs and minimum time out of service.

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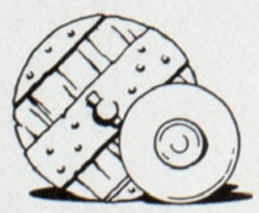


We can only guess about the origin of the wheel. Perhaps a rolling log suggested the idea to primitive man, and the first wheels may have been sections of tree-trunk. The underlying principle has never changed. From crude cart-wheels of stone to balloon-tired discs of alloy steel, all progress has come through refinement.

In much the same way, the principle of the mesh or net, on which Exide-Ironclad positive plates are designed, has been known to man for ages. The principle is basic, changeless—it is the use to which it has been put in the Exide-Ironclad Battery, and the constant refinement through the years, that have resulted in a battery of ever-increasing quality and value.

A new material, known as Giant Compound, made jars and covers possible that are practically unbreakable in normal service. Increased sediment space rendered it unnecessary to tear down the battery for cleaning, throughout its life. To support the plates, four ribs instead of two were built into the bottom of cell jars, so that all positive plates are supported separately from the negative plates. Further decreasing the possibility of internal short circuits, two feet were incorporated in the bottom of each plate, raising the plate above its supporting ribs and permitting the separators to come below the bottom of all plates.

Exide Mipor Separators—a recent, revolutionary development—are the long sought permanent storage battery plate insulators. Exide Mipor is immune to electrolyte, heat and vibration.

Exide
IRONCLAD
SILVER ANNIVERSARY
1910 – 1935

BUILT ON A PRINCIPLE AS BASIC AS THE WHEEL

yet different from all other batteries

The Exide-Ironclad completes a quarter century of service

JUST twenty-five years ago (September 9, 1910) The Electric Storage Battery Company, after more than two decades of developement and experience, announced a new type of storage battery, designated the Exide-Ironclad. Built on the principle of the mesh that holds solids while permitting liquids to pass freely—a principle that ranks with the wheel in antiquity and importance—the Exide-Ironclad marked an entirely new era in storage battery development.

In the unique design of its positive plates, slotted rubber tubes retain the active material, while exposing it freely to the electrolyte — a type of construction which a quarter century of service has proved to be of exceptional merit.

For the first time in storage battery history, there was made available a battery that combined all four of the essential battery characteristics: high power ability, high electricial efficiency, extreme ruggedness, and long life.

Starting from scratch, the Exide-Ironclad had its way to make in the industry. Accepted by users at first entirely on their faith in its makers, year by year in actual service the Exide-Ironclad proved the merits of its construction and its many advantages, until today it holds a pre-eminent position of leadership in the industry.

Users of Exide-Ironclad Batteries are numbered in the thousands. The majority of the submarine boats of the United States Navy, and many in foreign navies are propelled, when submerged, by Exide-Ironclad Batteries. These batteries are most widely used in marine service, both for routine and emergency operation of all electrical auxiliaries. In factories, mills, industrial plants, wharves and warehouses, they furnish the power for many thousands of electric industrial trucks and tractors.

Deep underground, Exide-Ironclads propel storage battery locomotives used for gathering and main-line haulage in coal and metal mines. Through mountains and under extinct volcanic crators in California, large fleets of Exide-Ironclads are helping in the construction of the greatest engineering projects now under way in the world.

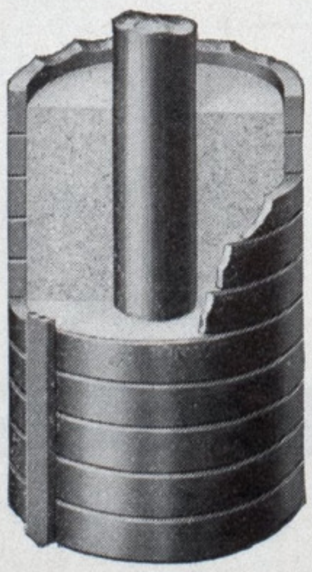
In addition, Exide-Ironclads operate electric and street trucks, industrial and railway switching locomotives. They help to make safe and comfortable the journey of travelers, being most extensively used, not only in marine service, but for air-conditioning, car-lighting and Diesel engine starting by our great railway lines.

In 1910, the Exide-Ironclad was a battery such as engineers dreamed of. In 1935, it is a battery of dependability proved by a quarter century of actual service.

Here are the features that, for 25 years, have contributed to safety at sea, to economy on every size and type of craft, and to efficient, low-cost materials handling service in electric industrial trucks:

1. **High Power Ability — providing great reserve power for conditions of excessive load.**
2. **High Maintained Voltage — assuring unfailing normal operation of equipment during periods of prolonged discharge.**
3. **High Electrical Efficiency — returning in useful work an extremely high percentage of the current charged into them.**
4. **Unusually Rugged Construction — maintenance costs stay at a minimum. Exide-Ironclads on the job practically take care of themselves.**
5. **Exceptionally Long Life — the economy of Exide-Ironclads is spread over a long period of faithful service.**

These, in constantly greater measure, are what you can expect of the Exide-Ironclad Battery today — and in the future.



Showing clearly how the slotted rubber tubes of the Exide-Ironclad positive plate retain the active material, and hold it in contact with the metallic conducting core which is a part of the grid of the plate. Although the electrolyte can easily penetrate the tiny slits in the tube, the active material cannot readily escape.

THE ELECTRIC STORAGE BATTERY CO., Philadelphia

The World's Largest Manufacturers of Storage Batteries for Every Purpose

Exide Batteries of Canada, Limited, Toronto

Exide
IRONCLAD
MARINE BATTERIES
WITH EXIDE MIPOR SEPARATORS

"MIPOR," Reg. U. S. Pat. Off.

Covered Ways

Pioneered, in private yards, by New York Ship over a generation ago.

To

Protect workmen from weather,
Handle materials more readily,
Launch more nearly finished ships,
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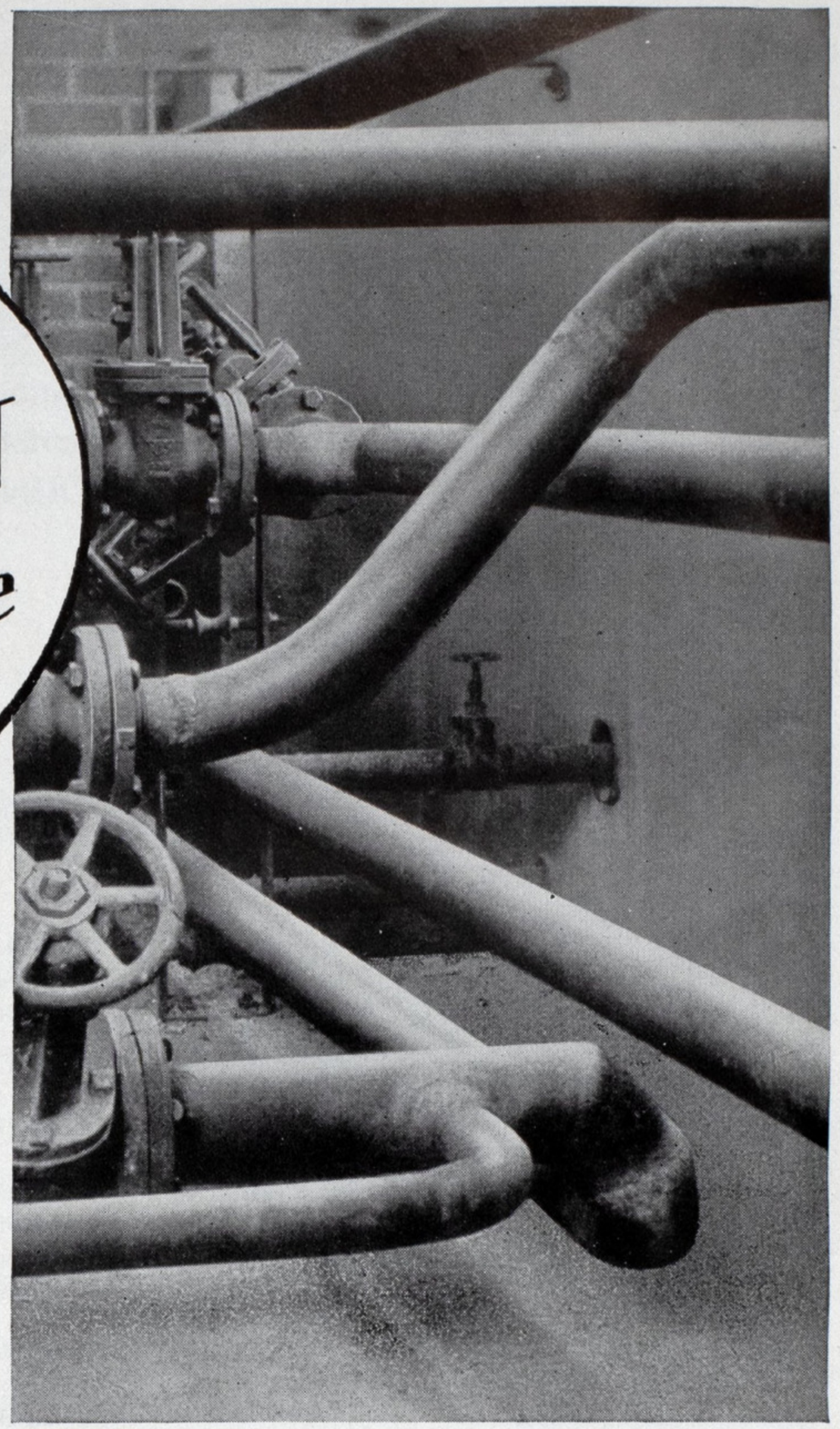
Snow in winter, sun in summer hampered men and construction before New York Ship proved this shipbuilding innovation.

Other NYS shops are also under roof which lessens interruptions.

NEW YORK SHIPBUILDING CORPORATION

Camden, New Jersey, U. S. A.

Oxwelded piping cheaper FIRST and LAST ...and more dependable



This picture, made before insulation was applied, shows the smooth contours that can be obtained by oxwelding even where headers, tees, and turns are involved in various sizes of pipe.

ON every count . . . first and last cost . . . oxwelded piping is a paying investment. Figures, in hard dollars and cents, prove it.

For instance: Nearly 10,000 feet of piping was installed in a power house and heating plant by oxwelding. Pipe sizes ranged up to 12 inches in diameter to carry oil, exhaust steam, compressed air, steam heat and water. *Even the one-half inch pipe was oxwelded!* Working pressures were 10 to 250 lb. Engineers wanted a permanent, strong job. They wanted jointless piping . . . leakproof now . . . and forever.

Oxwelding gave them what they wanted . . . more than they expected. Every specification that would insure satisfactory performance was more than met. *And in addition*, the oxwelded piping was installed at a 43 per cent saving in labor, time and materials. *This was a clear profit of $19,602 over doing the job by the older methods.*

Cost Records Prove Results

Unbelievable as these figures might seem at first glance, they are fully confirmed by detailed cost records. And what is more, these savings will be multiplied in the years to come, for oxwelded piping is a paying investment year after year. Once in it requires no further attention.

You, too, can get the most out of your piping installations, just as thousands of other companies have done, by consulting first with the Linde organization.

Ask the nearest Linde Sales Office for further details. Offices are located in Atlanta—Baltimore, Birmingham, Boston, Buffalo, Butte—Chicago, Cleveland—Dallas, Denver, Detroit—El Paso—Houston—Indianapolis—Kansas City—Los Angeles—Memphis, Milwaukee, Minneapolis—New Orleans, New York—Philadelphia, Phoenix, Pittsburgh, Portland, Ore.—St. Louis, Salt Lake City, San Francisco, Seattle, Spokane and Tulsa.

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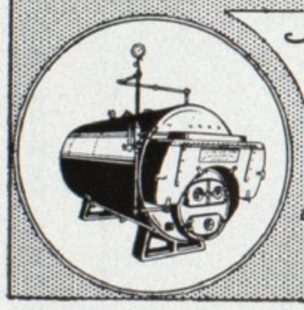

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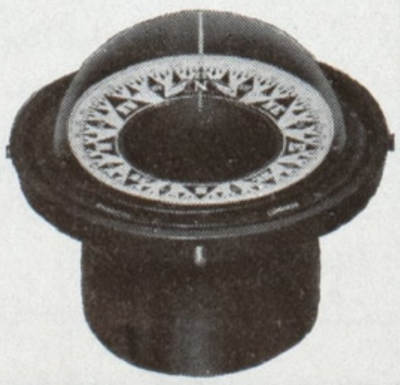

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THE knowledge gained by 71 years of highly successful operation on the transatlantic run finds its expression in this newest creation of France . . . The NORMANDIE.

Last year the *Ile de France* again carried more first-class passengers per eastbound voyage than any other express liner in the North Atlantic service. It is success like this over a period of years that justifies the introduction of this great ship.

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PHILADELPHIA

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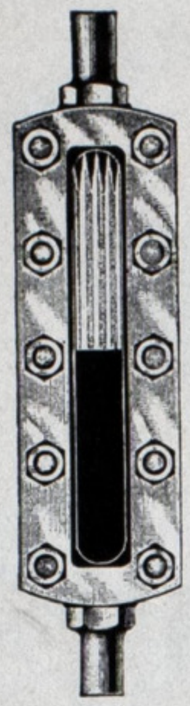

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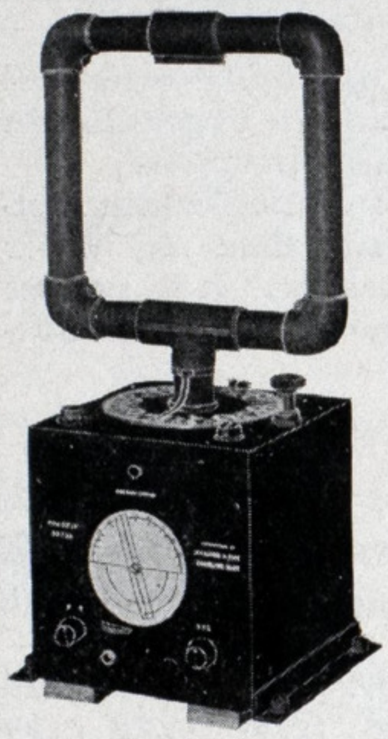

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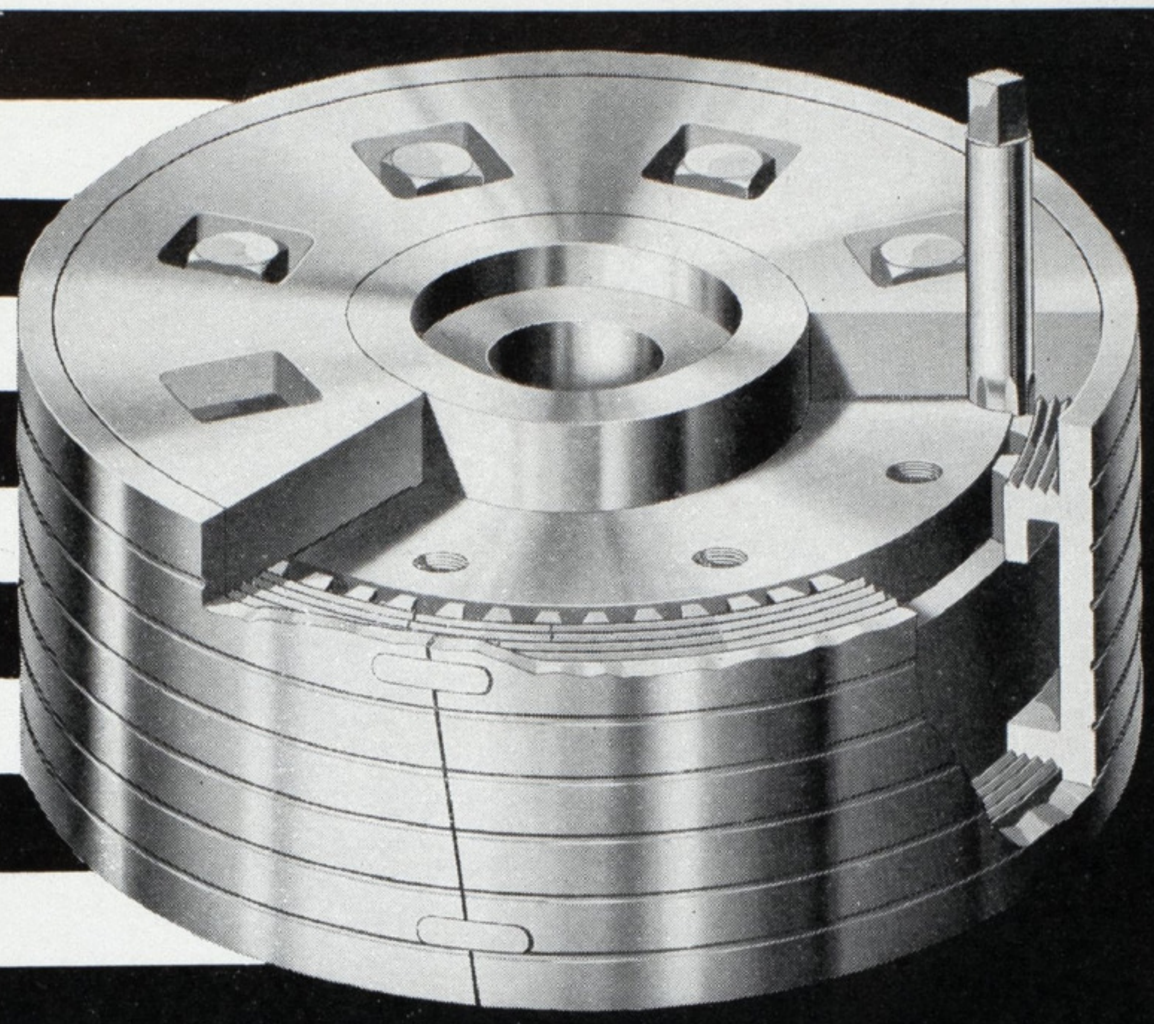
3. A true circle at all diameters
4. Cannot steam set
5. Saves steam by assuring snug fit



Adjusting is accomplished by loosening the follower, removing a small plug and inserting a tool in the pinion. This engages a rack, as shown in the cutaway. The pinion is turned until the "feeler" used indicates proper clearance. The follower bolts are then screwed down tight, the tool is replaced by the plug and the piston is solid once more.

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But the ordinary plug piston becomes worn after a short time in use and develops steam leaks. This means lost power . . . and waste.

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